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April 27, 2010

Mr. John Kessler
Siting Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Subject: Rice Solar Energy Project (09-AFC-10)
Response to CEC Biological Resources Data Requests 49–51, 54, 56, 58, and 75
Response to CEC Soil and Water Resources Data Request 121

Dear Mr. Kessler:

Attached please find one hardcopy and one CD of Rice Solar Energy, LLC's, responses to the following California Energy Commission Staff Data Requests for the Application for Certification for the Rice Solar Energy Project (09-AFC-10):

- Data Request 49-51 – Analysis of Potential Impacts to Fringe-toed Lizard Habitat at the Rice Solar Energy Project
- Data Request 54 – Burrowing Owl Mitigation and Monitoring Plan
- Data Request 56 and 58– Mitigation and Monitoring Plan for Bird Collision and Incineration and Evaporation Pond Bird Mortality
- Data Request 75 – Weed Management Plan
- Data Request 121 – Drainage Erosion and Sediment Control Plan

If you have any questions about this matter, please contact me at (916) 286-0278 or Sarah Madams at (916) 286-0249.

Sincerely,

Douglas M. Davy, Ph.D.
AFC Project Manager

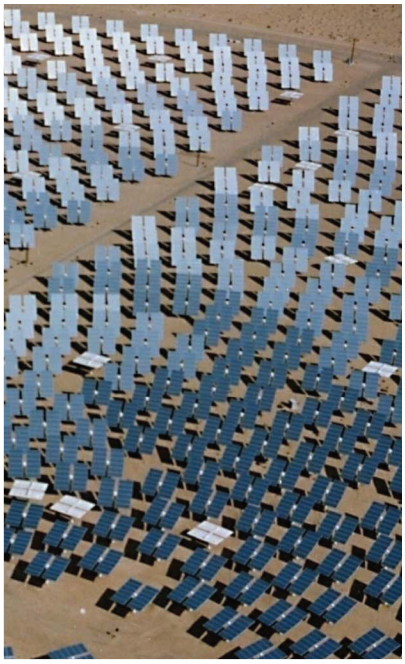
cc: POS List
Project File

Supplemental Filing

Application for Certification

Response to CEC Data Requests 49–51, 54, 56, 58, 75, and 121

Rice Solar Energy Project



Submitted by
SOLARRESERVE

Submitted to
California Energy Commission

With Technical Assistance by
CH2MHILL

EY072009005SAC

April 2010

Supplemental Filing

Response to CEC Staff Data Requests 49-51, 54, 56, 58, 75, and 121

In support of the

Application for Certification

for the

Rice Solar Energy Project

(09-AFC-10)

Submitted to the:

California Energy Commission

Submitted by:

SOLARRESERVE

With Technical Assistance by:

CH2MHILL

Sacramento, California

April 2010

Contents

Attachments

Introduction

Attached are Rice Solar Energy, LLC's (RSE) responses to California Energy Commission (CEC) Staff data requests numbers 49–51, 54, 56, 58, 75, and 121 for the Rice Solar Energy Project (RSEP) (09-AFC-10). The CEC Staff served the data requests on February 16, 2010, as part of the discovery process for the RSEP.

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as CEC Staff presented them and are keyed to the Data Request numbers (49–51, 54, 56, 58, 75, and 121). New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 15 would be numbered Table DR15-1. The first figure used in response to Data Request 28 would be Figure DR28-1, and so on.

Additional tables, figures, or documents submitted in response to a data request (supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of a discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, although they may have their own internal page numbering system.

Biological Resources (49–51, 54, 56, 58, and 75)

Aeolian Sand Habitat Creation

49. *Please provide information, including any appropriate modeling and quantitative analysis, describing how wind and water contribute to the creation and maintenance of any aeolian sand habitat (e.g., dunes, sand hummocks, sandfields, or partially stabilized sand dunes) on the project site and between the site's southern boundary and the larger Rice Valley dune system, approximately 0.75 mile to the south.*

Response: An analysis of the Aeolian sand habitat is provided as Attachment DR49-1.

Aeolian Sand Habitat Changes

50. *Please provide an analysis, including any appropriate modeling or quantitative assessment, of the potential direct and indirect effects of project construction and operation (for example, alteration of hydrology, dust palliatives, fencing) on creation and maintenance of aeolian sand habitat.*

Response: Please see Data Response DR49.

Mitigation Plan for Aeolian Sand Habitat

51. *Please provide a draft mitigation plan for avoidance and minimization of direct and indirect impacts to aeolian sand habitat. The mitigation plan should include measures for minimizing direct impacts to any preserved habitat during construction, indirect effects of operation, and a plan for compensatory mitigation.*

Response: Please see Data Response DR49.

Draft Burrowing Owl Mitigation and Monitoring Plan

54. *Please provide a draft Burrowing Owl Mitigation and Monitoring Plan.*

Response: The Burrowing Owl Mitigation and Monitoring Plan is provided as Attachment DR54-1.

Bird Collision and Incineration Monitoring and Mitigation Plan

56. *Please provide a Draft Bird Collision and Incineration Monitoring and Mitigation Plan to describe the following, in detail:*

    a. *Specific methods and schedules for locating and quantifying the remains of birds killed by collision with the solar collector tower or incinerated by flying between the tower and the reflector field. Include methods for identifying dead birds to species or higher taxonomic rank.*

    b. *Quantitative thresholds to determine the point at which bird mortality mitigation measures must be implemented. Please include a descriptive rationale to validate the recommended thresholds.*

    c. *Feasible measures to be implemented by the operator in the event that bird mortality exceeds proposed thresholds, and follow-up monitoring to evaluate their efficacy.*

d. Describe method and location for disposition of bird specimens (e.g., to a resource agency, museum, or on-site facility). List any necessary permits for specimen handling or disposition.

Response: The Mitigation and Monitoring Plan for Bird Collision and Incineration and Evaporation Pond Bird Mortality is provided as Attachment DR56-1.

Evaporation Pond Bird Mortality Monitoring and Mitigation Plan

58. Please provide a Draft Evaporation Pond Bird Mortality Monitoring and Mitigation Plan to describe the following, in detail:

a. Characterizing the wastewater quality to be evaporated during initial discharge to the ponds and in its highest concentration before complete evaporation;

b. The concentrations of mineral solids that would result;

c. A table comparing (a) and (b) above with the thresholds at which concentrations of water quality and solid constituents would be toxic to wildlife;

d. Specific methods and schedules for locating and quantifying bird use and bird mortality at the proposed evaporation ponds; Include methods for identifying dead birds to species or higher taxonomic rank.

e. Quantitative thresholds to determine the point at which bird mortality mitigation measures must be implemented; Please include a descriptive rationale to validate the recommended thresholds.

f. Feasible measures to be implemented by the operator in the event that bird mortality exceeds proposed thresholds, and follow-up monitoring to evaluate their efficacy; and

g. A description of the method and location for disposition of bird specimens (e.g., to a resource agency, museum, or on-site facility). List any necessary permits for specimen handling or disposition.

Response: The Mitigation and Monitoring Plan for Bird Collision and Incineration and Evaporation Pond Bird Mortality is provided as Attachment DR56-1.

Noxious Weeds – Weed Management Plan

75. Please prepare and submit a Draft Weed Management Plan that includes the herbicide compounds and formulations to be used in control methods, and describes specific methods for weed management under heliostat structures (e.g., pre-emergent herbicide or other methods).

Response: The Draft Weed Management Plan is provided as Attachment DR75-1.

Attachment DR49-1
Analysis of Potential Impacts to Fringe-toed Lizard Habitat at the Rice Solar Energy Project

Analysis of Potential Impacts to Fringe-toed Lizard Habitat at the Rice Solar Reserve Project

PREPARED FOR: Jeff Benoit/Solar Reserve

PREPARED BY: W. Geof Spaulding/CH2M HILL

DATE: April 23, 2010

Prologue

On February 16, 2010, California Energy Commission (CEC) Staff provided the first round of data requests for the Rice Solar Energy Project. Data requests (provided below) identified a need for additional information regarding potential impacts to the aeolian sand habitat.

> 49. Aeolian Sand Habitat Maintenance. Please provide information, including any appropriate modeling and quantitative analysis, describing how wind and water contribute to the creation and maintenance of any aeolian sand habitat (e.g., dunes, sand hummocks, sandfields, or partially stabilized sand dunes) on the project site and between the site's southern boundary and the larger Rice Valley dune system, approximately 0.75 mile to the south.
>
> 50. Impacts of Project to Aeolian Sand Habitat. Please provide an analysis, including any appropriate modeling or quantitative assessment, of the potential direct and indirect effects of project construction and operation (for example, alteration of hydrology, dust palliatives, fencing) on creation and maintenance of aeolian sand habitat.
>
> 51. Mitigation Plan for Impacts to Aeolian Sand Habitat. Please provide a draft mitigation plan for avoidance and minimization of direct and indirect impacts to aeolian sand habitat. The mitigation plan should include measures for minimizing direct impacts to any preserved habitat during construction, indirect effects of operation, and a plan for compensatory mitigation.

In their *Background* to Data Request 49-51, CEC Staff noted the following:

> Staff needs additional information about any potential effects of the project to on-site aeolian sand habitat that may support Mojave fringe-toed lizards (and perhaps other sensitive biological resources) in scattered or intermittent patches.

It further noted that "The AFC does not indicate whether Mojave fringe-toed lizards occur on or near the proposed transmission line alignment."

In their discussion immediately prior to the Data requests 49-51, CEC Staff also note that they need additional information on:

1. "…any potential effects of the project to *on-site* aeolian sand habitat that may support Mojave fringe-toed lizards (and perhaps other sensitive biological resources) in scattered or intermittent patches." (italics added)

2. "… any effects of the project to *off-site* aeolian sand habitat that may support these resources between the southern project site boundary and the extensive Rice Valley dune system to the south. For example, it is not clear if fluvial sand transport and deposition on the site may contribute to small patches of suitable aeolian sand on-site or (downstream and downwind to the south) off-site for Mojave fringe-toed lizards." (italics added)
3. "…. what proportion of sand supply to any scattered patches of off-site aeolian sand habitat would be interrupted by proposed project construction and operation."

Introduction

The responses to these requests require an understanding of the following:

- The roles of local and regional sand sources, and their contributions to aeolian sand sinks in the Rice Valley
- The distribution of open, aeolian sand habitat within the project site area, including the transmission line corridor
- Related to the above, the difference between fluvial and aeolian sand surfaces across the site

This last item is to address CEC Staff's desire for further clarity regarding whether fluvial sand transport and deposition on the site may contribute to small patches of suitable aeolian sand on site or (downstream and downwind to the south) off site for Mojave fringe-toed lizards.

To respond to CEC Staff's questions, we present first a summary of the physiography and geology of the project area. The physiographic setting of Rice Valley affects the direction of the prevailing winds, and with that the geology of the area strongly affects the mobility and deposition of aeolian sand in the immediate area. This is followed by a summary of the research on the aeolian geomorphology of the Mojave and Colorado Deserts. These studies provide perspective not only on the magnitude of disturbance necessary to mobilize the most sand, but also on the source of the sands deposited in Rice Valley. The results of the field work and remote imagery analysis will be presented next, followed by conclusions structured to address the data requests articulated above.

Physiography and Geology of the Project Area

The project area lies in the northern Colorado Desert as defined by some authors, which is the Lower Colorado Valley subdivision of the Sonoran desert as defined by Shreve (1964; see also Hickman, 1993). Like the Mojave Desert to the north, this area is a summer-dry region, lying beyond the reach of the summer monsoons that typify the remainder of the Sonoran Desert farther east. Lack of summer precipitation and extreme summer temperatures contribute to severe summer drought and hence the sparse vegetation cover in this region.

The area lies in the Basin and Range physiographic province of the interior West (Fenneman, 1931), typified by internally drained basins separated by intervening mountain ranges. Physiographically, this area is dominated by many small mountain ranges

surrounding broad valleys. In most of the Basin and Range, the mountains are oriented generally north-south and the valleys are consequently elongated north-south. This is not the case in the Colorado Desert area due to differences in the direction of crustal deformation here compared to the rest of the Basin and Range. The zone of anomalous deformation through this region is called the Maria Fold and Thrust Belt (Glazner et al., 1994).

The Rice Valley is bounded by the Turtle Mountains to the north, the West Riverside and Riverside Mountains to the east, the Big Maria and Little Maria Mountains to the southeast and south, respectively, and the low Arica Mountains to the west (Figure 1). The axis of Rice Valley is oriented WNW to ESE, with relatively low alluvial sills separating the valley from the Danby Dry Lake basin to the northwest, and the Colorado River Valley to the southeast (Figure 1). Elevations range from approximately 690 feet above mean sea level (asl) in the valley bottom about 1.75 miles south of the project area, to 740 and 930 feet asl on the south and north boundaries, respectively, of the project area on the Turtle Mountains bajada.[1] The solar array and plant site, and the first several miles of the generator tie-line, are located on the southern bajada of the Turtle Mountains. The last approximately 5 miles of the generator tie-line are located in similar habitat on the distal part of the bajada extending west and south from the West Riverside Mountains (Figure 1).

Advances in Aeolian Geomorphology

A Model of Fringe-toed Lizard Habitat

Barrows (1996) describes an "ecological model" of the origin and maintenance of aeolian sand habitat for the Coachella Valley fringe-toed lizard (*Uma inornata*) that captures the essential components necessary for the model used in this study as well. It is assumed here that the physical aspects of Mojave fringe-toed lizard (*Uma scoparia*) habitat, the focus of this study, are no different from those of the Coachella Valley fringe-toed lizard (*U. inornata*). Its habitat consists of open or sparsely vegetated aeolian (wind-deposited) sand. Aeolian sand is easily differentiated from alluvium (and even from alluvial sand) to the extent that it is composed exclusively of well-sorted, small-to-medium sized sand grains capable of being transported by the wind, and is lacking silt. Large sand grains are not present, and gravel is absent. Lack of silt confers a looseness to aeolian sand usually not found in alluvial sand which, due to its fine-grained component, binds or encrusts readily with the first episode of high soil moisture.

At its basics, Barrows' (1996) model of the origin and maintenance of Coachella Valley fringe-toed lizard habitat is a description of the interrelationship among geomorphic processes that result in maintaining areas of open or sparsely vegetated aeolian sand (dune fields and sand sheets) that is habitat for the fringe-toed lizard (FTL). Essential to this model is that, despite the size of the Coachella Valley and the myriad sand sources associated with the Whitewater River drainage there, the source of the sand comprising the FTL habitat is restricted and localized. Washes issuing from the western Indio Hills are the chief source of sediment which, in turn, supplies the sand entrained in the prevailing winds and deposited on limited dune fields that are FTL habitat there (Barrows, 1996; see also Lancaster, 1997). Therefore, with the sand source and its wind-driven pathway identified, steps could be

[1] A bajada is the ramp of alluvium that extends from the axes of southwest desert valleys to the piedmonts of surrounding mountain ranges, and is composed of coalescing alluvial fans.

taken to identify and minimize factors that would constrain sediment supply, or block the effective transport of sand to the FTL habitat.

Aeolian Sand Studies in the Area

As noted above, the extension and then rotation of crustal blocks was so extreme that a northwest-southeast orientation was imparted to the mountain ranges and associated valleys in this area. This physiography is important in funneling the regional winds responsible for sand transport and deposition. It is widely recognized that winds here have a substantial northwesterly component (e.g. Lancaster and Tchakerian, 1996; Pease and Tchakerian, 2003). This is supported by the data available from U.S. Army Air Corps, summarized in the wind rose for a limited period in 1944 and 1945 (Figure 2). Stronger winds being more capable of transporting sand, it is important to note that the strongest winds in this record are also from the northwest (Figure 2).

The Rice Valley lies at the eastern end of a series of valleys that form a more-or-less continuous corridor named the Bristol Trough (Pease and Tchakerian, 2003) for Bristol Dry Lake near its western end, some 60 miles upwind. Determining whether the sources of aeolian sand in the bottom of the Bristol Trough's valleys are local or regional is a question pursued by several researchers. While the concept of inter-valley sand transport through the Bristol Trough is still favored by some workers (e.g. Stone, 2006), most critical tests have not found support for this hypothesis. Geochemical and mineralogical investigations of a number of sand deposits, including those in the Rice Valley, led Pease and Tchakerian (2003), Zimbelman and Williams (2002), and Muhs (2004) to conclude that sand deposits in the Bristol Trough are not integrated, and the sand in the individual valleys is primarily from local sources. The finding that sources of aeolian sands appear to be mainly local accords with the fact that local sources maintain the sand dune habitat of the Coachella FTL (Barrows, 1996; Lancaster, 1997).

Largely Pleistocene-age aeolian landforms have been the focus of most previous studies in the area. These include the extensive field of large linear dunes on the south side of the axial drainage of Rice Valley (Figure 3), as well as sand ramps such as that of the Big Maria Mountains (Figures 1 and 4). Rendell and Sheffer (1996) established that the last major episode of sand accumulation on the Big Maria Sand Ramp was from about 14,000 to 7,000 B.P. (before present [1950 for convention's sake]). This is likely the time that the large dunes south of the axial valley were also active (Figure 3). As noted above, Pease and Tchakerian (2003), Muhs (2004), and Lancaster and Tchakerian (1996) marshal different lines of evidence to all conclude that the large aeolian features such as the sand ramp of the Big Maria Mountains (Figure 4) are composed of locally derived sand and, therefore, local mass wasting processes on nearby bajadas are the main sources of sand. The last time this occurred on a grand scale was at the end of the last glacial age (ca. 14,000–7,000 B.P.). Ponti (1985) showed that these regional mass wasting events occurred at the end of each of the last three or four glacial terminations. As a result of desertification brought about by post-glacial climate change (Spaulding et al., 1983), slopes lost their vegetation cover. Associated with a change in seasonal rainfall regime (Spaulding and Graumlich, 1986), accelerated erosion resulted in wide-spread hill-slope stripping (Dohrenwend et al., 1991). This provided a supply of new sand for deflation and led to the creation of now-stabilized dune fields and sand-ramps that exceed, by orders of magnitude, the area currently typified by active sand dunes (Figures 1, 3). That there is little evidence for sand mobilization and accumulation

during the subsequent hyperarid Middle Holocene (7,000 to 5,000 B.P.; Spaulding, 1991) suggests that available sediment supply and therefore sand source, and not aridity *per se*, is key to the accumulation if not maintenance of open aeolian-sand habitats (see also Lancaster, 1997; Mehringer and Warren, 1976). For example, evidence for sporadic Late Holocene sand deposition is found downwind of the Mojave River in the central Mojave Desert, because the river provides an ample sediment source regularly replenished by flood events (Rendell and Sheffer, 1996). No major episodes of sand accumulation have been recorded for the last 7,000 years in Rice Valley.

Current Investigations and Results

Remote imagery and topographic mapping were used to identify major landforms in the study area based on differences in albedo (reflectively), vegetation density, and drainage patterns, among other criteria. These interpretations were refined during the course of field work. Field data consist of the stratigraphy of two exploratory trenches excavated within the planned solar generation facility, geomorphological characterization of 16 stations established for that purpose, and notes from reconnaissance of the Rice Valley and the project area on 23 June, 2009, and 25 and 26 March, 2010.

The Bajada Surfaces

Virtually the entire project, including the generator tie-line, is proposed for the Turtle and West Riverside Mountains bajadas. Field investigations show that they are very similar in a number of respects, and share the following characteristics:

- The component alluvial fans are derived primarily from granitic parent material. Granite breaks down relatively quickly into grüss, sandy very-fine gravel to coarse sand, rich in feldspathic and quartz grains. This is the "rotten granite" favored for some landscaping purposes.
- They are vegetated with creosote bush (*Larrea tridentata*) and burrobush (*Ambrosia dumosa*). These shrubs have comparatively small accumulations of wind-blown silts and sands at their base in most areas.
- Ephemeral drainages, or washes, are normally only shallowly incised (less than 18 inches) and the bar and swale topography typical of many bajada surfaces (e.g. Dohrenwend et al., 1991) is poorly expressed (Figure 5). These shallow washes are relatively numerous and describe networks of braided (anastomising) rills across the bajada surfaces.
- Interfluves between the washes are characterized by a poorly sorted silty, coarse fluvially transported sand (grüss) which supports a good growth of annual plants after rare wet winters (such as the spring of 2010). There are also common blow-out surfaces, where the desert floor is composed of an indurated silt crust, mantled with a lag-concentrate of gravel (Figure 5). Near the eastern terminus of the generator tie-line these deflated surfaces are more commonly armored by coarse gravel forming a weakly developed desert pavement.
- A distinctly reddened, argillic (clay-rich) soil occurs at or within 20 inches of the interfluve surfaces of both bajadas (see Figure 6). Its degree of reddening and carbonate

development show that it is a Pleistocene soil (McFadden et al., 1991), and its position at or near the surface in many areas suggests little to no net aggradation of the bajadas in at least the last 10,000 years.

The Valley Bottoms

Beyond the toes of the Turtle Mountains and West Riverside Mountains bajadas are two axial drainage systems (Figure 3). The larger occupies the bottom of Rice Valley and runs generally west-northwest to east-southeast. The smaller separates the West Riverside and Turtle Mountains bajadas, runs northeast-southwest, and is tributary to Rice Valley's axial drainage (Figure 3). The bottom of Rice Valley does not possess a defined channel because it is choked with both stabilized sand sheets and active dune fields. The stabilized sand sheet beyond the Turtle Mountains bajada (Figure 3) supports relatively dense desert scrub (Figure 7). The sand here has a greater silt component and possesses a distinctly lower albedo that the open, active dune fields mapped in Figure 3.

In sharp contrast to the stabilized sand sheet of Rice Valley, the axial drainage between the West Riverside and Turtle Mountains bajadas (Figure 3) supports only sparse creosote bush–burrobush scrub (Figure 8). Here many of the broad and shallowly incised channels appear to have been recently active.

Sand Transport

During field work and remote imagery analysis an eye was kept open for evidence of sand transport and clues to the direction of transport (e.g. sand streaks, ripple deposits, or other recently active aeolian deposits). The orientation of the ancient, stabilized dune systems as well as possible Pleistocene-Early Holocene ventifacts were not considered because the synoptic climatology of the region was different during and immediately after the last glacial age (e.g. Spaulding and Graumlich, 1986; Thompson et al., 1993), and the results would therefore not necessarily speak to current wind patterns. Evidence of active sand transport in the immediate vicinity of the project or generator tie-line was not as easy to find as evidence for deflation and sand accumulation in different areas.

As noted previously, limited meteorological data (Figure 2) and regional physiography both indicate a prevailing northwesterly vector for winds strong enough to effectively transport sand. Examination of remote imagery shows that on the northeastern side of the Arica Mountains (Figure 1) there is a sharp termination of a desert-varnished surface by aeolian deposits that is oriented W20˚N, or about west-northwest. However, the best evidence for current wind direct comes from the orientation of sand streaks trailing shrub hummocks in the currently active dune fields of Rice Valley. Available remote imagery does not offer sufficient resolution in all areas, but three sets of measurements were taken of populations of sand streaks in the dune field just east of the abandoned Arizona-California Railroad grade (Station 1), the dune field south of the project parcel boundary (Station 2), and that southeast of the confluence of the axial drainage of Rice Valley and that running between the Turtle and West Riverside Mountains bajadas (Station 3; Figure 3). The results are presented in the following table.

Station	Observations (N)	Mean (Degrees North of West)	Standard Deviation (±)
1	19	W70˚N	9˚
2	18	W68˚N	8˚
3	16	W97˚N	9˚

The results of the exercise confirm that prevailing wind capable of transporting sand is generally from the northwest. There is some suggestion from the measurement in the easternmost dune field (Station 3) that the prevailing wind possesses a more northerly component, perhaps as a result of the north-south orientation of the large axial drainage to its north (Figure 3).

Sand Sources and Sand Sinks

The areas of open dune fields in the axial drainage of Rice Valley (Figure 3) are considered islands of suitable FTL habitat in what is otherwise unsuitable habitat due to vegetation density (e.g. Figure 8) or due to inappropriate substrate. These are sand sinks as well as the heavily vegetated and stabilized sand sheet around the open dune fields (Figure 3 and 7). This densely vegetated expanse evidently acts as a sand sink given that the coppice mounds around the shrubs are well-developed, and the intershrub areas seem to be characterized by deep, silty sand.

The coarse, sandy alluvium typical of the washes and interfluves of the bajada surfaces (see Figures 5, 6, and 8) is much different from the fine, well-sorted sand typifying open dune habitat. This alluvium, when disturbed by fluvial or other means, is the primary source of sand for both open sand habitat as well as stabilized aeolian deposits. Flood events down the surface of the bajadas, as well as down the axial drainage between the two bajadas, provide the disturbance that exposes fresh alluvium which is subsequently deflated. Field observation suggests that this happens relatively quickly. There were several precipitation events in the area during the late winter of 2009–2010, and recently active wash bottoms were easy to find during March 2010 field work, but fine-sand and silt particles had been winnowed from their surface. In other words, a lag concentrate protecting most surfaces from further deflation had apparently developed within a month or two.

One other source of sand for ready deflation became evident during the course of this work. Remote imagery of the distal portion of the West Riverside Mountains in particular, but also on the Turtle Mountains bajada, shows that there are literally thousands of kangaroo rat (*Dipodomys*) mounds (see Figure 9) in these surfaces. In the field most appear to be occupied, and freshly turned earth is found on most. This bioturbation multiplied a thousand fold must also contribute to sands accumulating downwind in the Rice Valley. Therefore, disturbance on the lower portion of these bajada surfaces, through either fluvial erosion or bioturbation, is the primary source of sand for the FTL habitats in the axial drainage of Rice Valley.

Conclusions

Data Request 49

> "49. Aeolian Sand Habitat Maintenance. Please provide information, including any appropriate modeling and quantitative analysis, describing how wind and water contribute to the creation and maintenance of any *aeolian sand habitat (e.g., dunes, sand hummocks, sandfields, or partially stabilized sand dunes) on the project site and between the site's southern boundary and the larger Rice Valley dune system, approximately 0.75 mile to the south."* (emphasis added)

Response

Descriptions of sand sinks and sources, processes involved in sand transport, and evidence for their action is presented above. Field review demonstrates unequivocally that there is no aeolian sand habitat on the project site, or between the project site and the edge of Rice Valley's axial drainage (Figure 3). To the south of that, there is an extensive area of stabilized and well-vegetated sand sheet (Figures 3 and 7).

Data Request 50

> "50. Impacts of Project to Aeolian Sand Habitat. Please provide an analysis, including any appropriate modeling or quantitative assessment, of the potential direct and indirect effects of project construction and operation (for example, alteration of hydrology, dust palliatives, fencing) on creation and maintenance of aeolian sand habitat."

Response

Construction activity in the vicinity of the project would disturb the surface of the bajada and make more sand available for deflation. Mitigation measures pursuant to air quality regulations would reduce the amount generated, but the net effect may still be to expose more fine sand to deflation. Given the prevailing northwesterly wind, this aeolian sediment would be primarily transported across the toes of the Turtle and West Riverside Mountains bajadas to the southeast. Some sand generated at the project site may also be blown to and captured by the dense vegetation of the stabilized sand sheet upwind of the Station 3 dune field (Figure 3). Given the density of the vegetation (see Figure 7), however, it is doubtful that more than a minimal amount of sand would reach the FTL habitats there. And, regardless, sand added to this sink would be a beneficial effect to the extent it would contribute to the maintenance of open aeolian sand habitat.

Operation would result in minimal surface disturbance and the generation of little additional aeolian materials.

The objective of stormwater control and drainage measures associated with the construction of the project is to minimize obstructions to through-flowing ephemeral drainages, and therefore no reduction in runoff is expected downstream of the project site. Some increase in runoff may occur due to an increase in area not subject to infiltration. Any additional sediment generated and subject to deflation would also be transported by the northwest wind across the toes of the Turtle and West Riverside Mountains bajadas to the southeast. Some may be captured in the relatively dense vegetation of the stabilized sands sheets occupying the axial drainage of Rice Valley. This process is ongoing, as shown by the extensive hummocks of silty sand (see Figure 7). Sediment that may be transported by

fluvial action to the axial drainage of Rice Valley also would be expected to be captured in this relatively thick vegetation.

Because FTL habitat, identified as the open sand dune fields in the axial drainage of Rice Valley, is well removed from the project area and its associated generator tie-line (Figure 3), no direct effect on FTL habitat is expected from project construction or operation. Indirect effects caused by the possible aeolian transport of sand from construction disturbance or additional storm runoff would be minimized by capture of generated sands in the naturally occurring dense vegetation of the axial valley's stabilized sand sheet (Figures 3 and 7). Any residual effect to FTL habitat would be negligible, and if it occurred at all would be positive in that additional sand for FTL habitat would be generated.

There are no data or field evidence that would suggest that construction or operation of this facility would interfere with the transport of sand to FTL habitat or otherwise negatively affect the net balance of aeolian sand habitats in Rice Valley. Winds from the northwest encountering the solar generation facility would be coming from the lower Ward Valley north of Danby Dry Lake (Figure 1) and cross the upper bajada and lower slopes of the Turtle Mountains before encountering the facility. These surfaces are not sources of aeolian sand, and turbulent wind crossing inter-basin divides drops what sand it is carrying. These factors account for the results of scientific investigations showing that inter-basin transfer of aeolian sand is minimal. Thus the facility would not impede sand transport because no substantive amount of sand transport occurs in that area.

Data Request 51

> "51. Mitigation Plan for Impacts to Aeolian Sand Habitat. Please provide a draft mitigation plan for avoidance and minimization of direct and indirect impacts to aeolian sand habitat. The mitigation plan should include measures for *minimizing direct impacts to any preserved habitat during construction, indirect effects of operation, and a plan for compensatory mitigation*." (emphasis added)

Response

This project avoids aeolian sand habitat and identifiable sand transport corridors. Therefore, no direct impacts to FTL habitat would occur from project implementation. Consequently, no plan for compensatory mitigation is needed.

Indirect impacts to FTL habitat are not expected. Were they to occur, they would be entirely beneficial to the extent that additional sand for FTL habitat. No blocking effect would occur to any identified or theoretically potential sand source. The upper bajada and mountain slopes northwest of the project site are not areas that could potentially supply aeolian sand to Rice Valley FTL habitat. All sand sources are local.

Because of the absence of direct impacts to FTL habitat, and the lack of evidence that would suggest the potential of any negative, indirect impact, no mitigation plans or measures are needed for effects to the Mojave fringe-toed lizard or its habitat.

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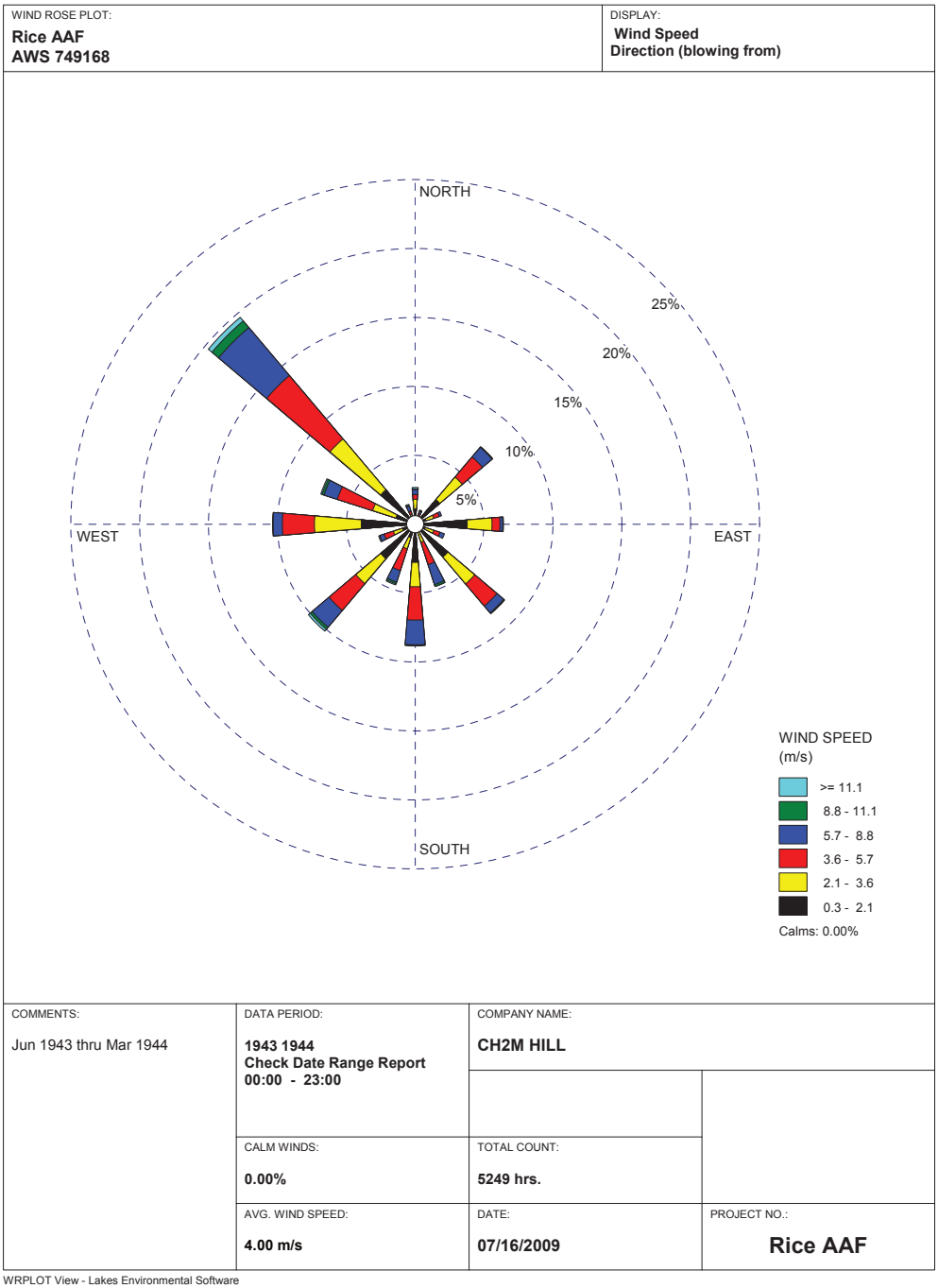
List of Figures

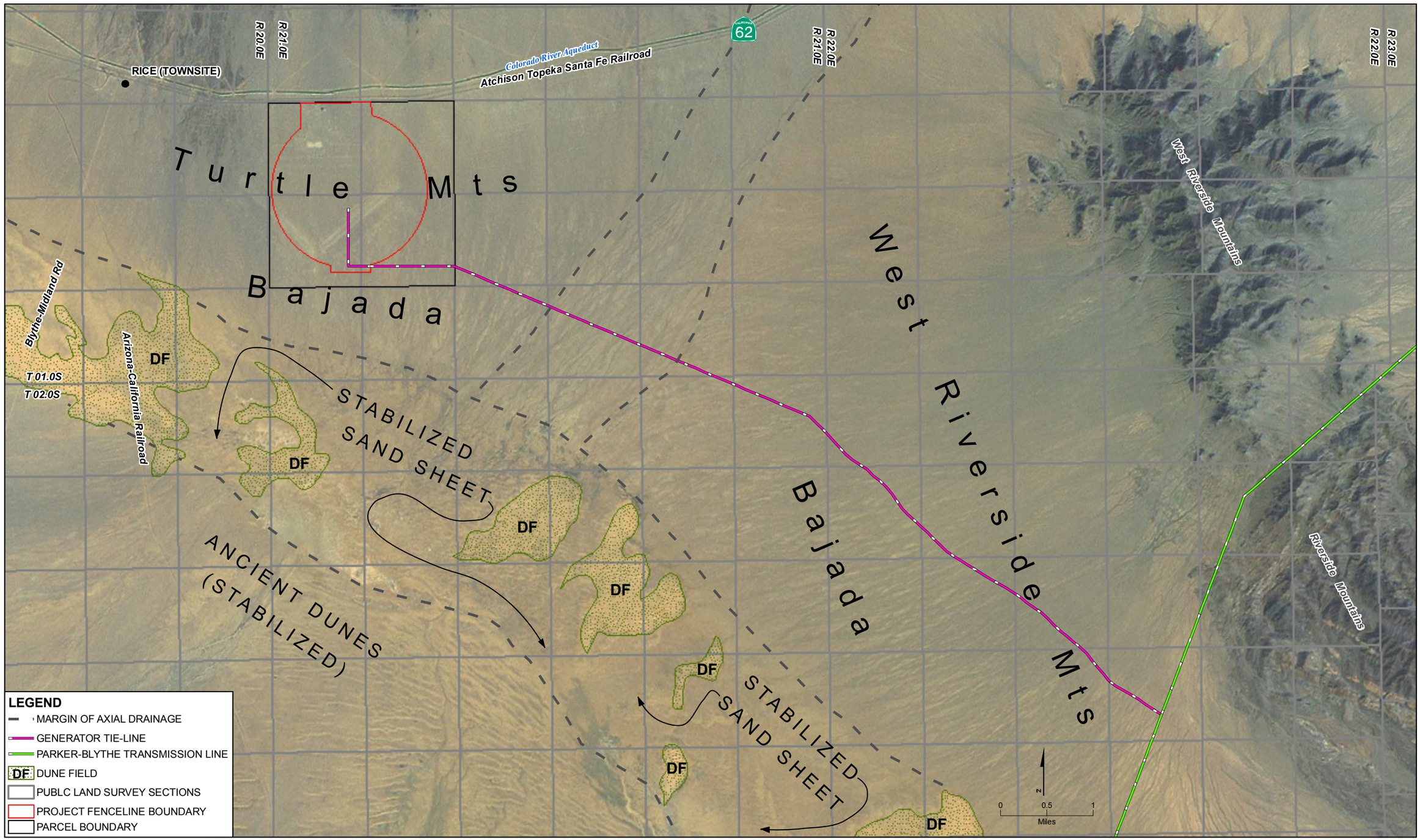
This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

FIGURE 1
REGIONAL SETTING
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA



Wind rose showing wind speed classes and directions for the Rice Army Air Field in 1944-1945.

FIGURE 2
Rice Solar Energy Project
Riverside County, California



This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

FIGURE 3
LANDFORMS OF THE STUDY AREA
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

View southeast from the Parker-Blythe transmission line (note the wires) across lower Rice Valley to the Big Maria Sand Ramp. The deep erosional cut to left of center exposes more than 100 feet of chiefly eolian sand.

FIGURE 4
Rice Solar Energy Project
Riverside County, California

Typical setting on the toe of the Turtle Mountains or West Riverside Mountains bajada. Note the relatively subdued topography. Along with the creosote bush and burrobush shrubs, the greenish hue is from annual plants growing in areas mantled with less-compact poorly sorted silty alluvial sand. The 12-inch ruler rests on a blow-out surface typified by encrusted sandy silt overlain by a lag concentrate of gravel and coarse sand. These blow-out surfaces support no vegetation.

FIGURE 5
Rice Solar Energy Project
Riverside County, California

The bank of a typically shallow wash on the toe of the bajada exposing about 4 inches of poorly consolidated sandy alluvium overlying the reddened Pleistocene soil typical of this area. Note also in the foreground the coarse nature of the alluvial sand in the wash bottom. Blue pencil is 6 inches long.

FIGURE 6
Rice Solar Energy Project
Riverside County, California

The stabilized and well-vegetated sand sheet occupying the floor of Rice Valley beyond the toe of the Turtle Mountains bajada, about 1 mile south of the project parcel boundary (Figure 3). View is west to the Arica Mountains (right) and the more distant Granite Mountains (left). Compare this habitat to typical bajada habitat shown in Figure 5.

FIGURE 7
Rice Solar Energy Project
Riverside County, California

The axial drainage system between the Turtle Mountains and West Riverside Mountains bajada. View east-southeast across the toe of the West Riverside Mountains bajada.

FIGURE 8
Rice Solar Energy Project
Riverside County, California

A typical kangaroo rat (*Dipodomys*) mound on the toe of the West Riverside Mountains bajada. The mound is roughly circular, about 6 to 18 inches above the surrounding surface, and extends from the white ruler in the right mid-ground to the truck in the background, and also left beyond the frame of this image. About five burrow holes are evident but subtly defined. View east-northeast to the West Riverside Mountains.

FIGURE 9
Rice Solar Energy Project
Riverside County, California

Attachment DR54-1
Burrowing Owl Mitigation and Monitoring Plan

Draft

Burrowing Owl Mitigation and Monitoring Plan

For the

Rice Solar Energy Project

(09-AFC-10)

Submitted to the:

California Energy Commission

Submitted by:

SOLARRESERVE

With Technical Assistance by:

CH2MHILL

Sacramento, California

April 2010

Contents

Introduction

This document provides a conceptual Mitigation and Monitoring Plan (Plan) for western burrowing owl (*Athene cunicularia*). This Plan is being provided in Response to California Energy Commission (CEC) Staff Data Adequacy Request #54 for the Rice Solar Energy Project (RSEP or project) (09-AFC-10). The primary purpose of this Plan is to provide a strategy to protect the western burrowing owl from potential impacts of project construction and operation. The mitigation measures being proposed in this Plan are subject to final approval by the resource agencies including the California Department of Fish and Game (CDFG) and CEC.

Project Description

Rice Solar Energy, LLC, (RSE) a wholly owned subsidiary of SolarReserve, LLC, proposes to construct, own, and operate the RSEP. The RSEP will be a solar generating facility located on a privately owned site in unincorporated eastern Riverside County, California. The project will be capable of producing approximately 450,000 megawatt hours (MWh) of renewable energy annually, with a nominal net generating capacity of 150 megawatts (MW).

The facility will use concentrating solar power (CSP) technology, with a central receiver tower and an integrated thermal storage system. The RSEP's technology generates power from sunlight by focusing energy from a field of sun-tracking mirrors called heliostats onto a central receiver. Liquid salt,[1] which has viscosity and appearance similar to water when melted, is circulated through tubes in the receiver, collecting the energy gathered from the sun. The heated salt is then routed to an insulated storage tank where it can be stored with minimal energy losses. When electricity is to be generated, the hot salt is routed to heat exchangers (or steam generation system). The steam is then used to generate electricity in a conventional steam turbine cycle. After exiting the steam generation system, the salt is sent to the cold salt thermal storage tank and the cycle is repeated. The salt storage technology was demonstrated successfully at the U.S. Department of Energy-sponsored 10 MW *Solar Two* project near Barstow, California, in the 1990s.

Project Location

The RSEP site is a privately owned parcel located in eastern Riverside County. The site is adjacent to State Route (SR) 62, which parallels a portion of the Arizona-California Railroad and the Colorado River Aqueduct, near the junction of SR 62 and Blythe-Midland Road, and near the sparse remains of the abandoned town of Rice, California. The nearest occupied residence is approximately 15 miles northeast at the rural crossroads community of Vidal Junction, California. The nearest town is Parker, Arizona (population 3,181), approximately 32 miles to the east. A small permanent residential settlement is located at the Metropolitan

[1] The salt is a mixture of sodium nitrate, a common ingredient in fertilizer, and potassium nitrate, a fertilizer and food additive. These mineral products will be mixed onsite as received directly from mines in solid crystallized form and used without additives or further processing other than mixing and heating.

Water District of Southern California's Iron Mountain Pumping Plant, approximately 17 miles west.

The RSEP is within a larger, privately owned, 3,324-acre holding (the ownership property). Within this larger property, the RSEP is sited in a new square-shaped parcel (the project parcel) that will be created by merging what are currently four different assessor's parcels, each of them a discrete section (square mile) of land, resulting in a single 2,560-acre parcel. Within this project parcel, a 1,410-acre project area will be fenced and will contain the administration buildings area, heliostat field with power block, and evaporation pond areas, (collectively, the project site or facility site). Areas outside the facility site but within the project parcel will not be fenced, developed, or disturbed as part of the RSEP.

Status of Burrowing Owl at RSEP

Burrowing owl surveys conducted for the project between April 18 and May 18, 2009, by Sundance Biology, Inc. in support of the AFC (AFC Section 5.2 and Appendix 5.2C) found that burrowing owl likely occur in the project area. As stated in the AFC and wildlife/desert tortoise survey report, survey transects followed the federal desert tortoise protocol, covered the entire project site, and included zone of influence (ZOI) transects. ZOI transects were in suitable adjacent habitat at 100 feet, 300 feet, 600 feet, 1,200 feet, 2,400 feet, ¾ mile and 1 mile from the outside edge of the 2,560-acre main survey area. ZOI transects were also conducted along the 10-mile-long generator tie-line in suitable adjacent habitat at 100, 300, 600, 1,200 and 2,400 feet from the outside edge of the generator tie-line corridor.

Field surveys conducted for the AFC in April and May recorded all burrowing owl sign observed, which included birds and burrows with and without whitewash (i.e., droppings, feathers, and diagnostic pellets) (see Table 1).

TABLE 1
Burrowing Owl Observations on the RSEP Site and Transmission Line Route, Spring 2009

Date	Observation	Location	UTM Easting	UTM Northing
13-May	Burrow	Transmission line 100-foot ZOI transect	707,161	3,769,005
14-May	Burrow, whitewash, pellets	RSEP site	702,875	3,771,926
14-May	Burrow, whitewash, pellets	RSEP site	702,854	3,771,805
14-May	Burrow, whitewash, pellets	RSEP site	703,036	3,771,885
15-May	Burrow, whitewash	RSEP site	702,711	3,772,178
15-May	Burrow	RSEP site	702,644	3,771,112
16-May	Burrow, whitewash, pellets, recent use	Transmission line	705,284	3,770,626

During the spring 2009 field surveys, six burrows were observed that showed an indication of burrowing owl use; one of these, located along the generator tie-line route, showed evidence of recent use. Burrowing owl population on the project site is thus likely to be somewhere between one and five nesting pairs on the project site and one or two nesting pairs along the transmission line.

Regulatory Status and Requirements for Burrowing Owls

Federal and California state laws and resource codes protect burrowing owls and their nesting habitat. Specifically, burrowing owls are protected by the federal Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711), making it illegal to take, possess, buy, sell, or barter any migratory bird, including feathers, other parts, eggs, nests or products. Although the burrowing owl has no current status under the federal Endangered Species Act (ESA), in 1995 the owl was listed as a Category 2 candidate species, indicating population decline. However, in 1996, the U.S. Fish and Wildlife Service (USFWS) eliminated Category 2 and now considers species formerly listed in this category to be "Species of Concern" or "Species at Risk", although these designations are not formally recognized under the ESA. In California, the burrowing owl was listed in 1978 by the CDFG as a Species of Special Concern, a category that has legal protections. As a special-status species, the burrowing owl is protected from direct and indirect impacts to birds and nests. Because disturbing nesting owls is a significant impact, measures to avoid or reduce the impact must be identified in accordance with California Environmental Quality Act (CEQA)

California Fish and Game Codes §3503, §3503.5, and §3800 also prohibit the take, possession, or destruction of birds, their nests or their eggs. To prevent take, project-related disturbances in owl breeding territories must be minimized or eliminated during the nesting season (typically February 1 to August 31). Take includes activities that cause nest abandonment, loss of reproductive effort, or loss of habitat necessary for owl survival and reproduction. Such activities would also violate the MBTA. Because of their semi-subterranean lifestyle, burrowing owls can go undetected and be inadvertently destroyed by ground-disturbing activities.

Birds are often observed just prior to ground-disturbance, resulting in last-ditch efforts to mitigate impacts, including relocation away from construction areas. Relocation attempts in which birds are captured and moved to new burrow sites miles away are called active relocations. These attempts are often unsuccessful, as many of these birds disappear from the relocation areas. Evicting birds from their nest burrows in construction areas and allowing them to relocate to new burrows on their own, or passive relocation, has a higher probability of success and is the preferred method of many owl specialists. In general, successful passive relocation is more likely the closer the new burrow is to the one that will be destroyed. State and federal laws require that relocations occur outside the owl nesting season. For more information on passive owl relocation, see the Attachment A, *the Burrowing Owl Consortium's April 1993 Survey Protocol and Mitigation Guidelines*. Notable points from the 1993 report are:

- Impacts to owls include disturbance within 160 feet of wintering burrows and 250 feet of a nesting burrows; destruction of an active burrow; or destruction/damage of foraging habitat within approximately 300 feet of an occupied burrow.

- Occupied burrows should not be disturbed during the nesting season (February 1 to August 31) to avoid "take" under the MBTA and fish and game codes.
- When destruction of occupied burrows is unavoidable, burrows should be enhanced (enlarged or cleared of debris) or created (by installing artificial burrows) in a ratio of 1:1 in adjacent suitable habitat that is contiguous with the foraging habitat of the affected owls.
- If owls must be moved away from the disturbance area, passive relocation is preferable to trapping (e.g., active relocation). A time period of at least one week is recommended to allow the owls to move and acclimate to alternate burrows.
- The mitigation committee recommends monitoring the success of mitigation programs as required in Assembly Bill 3180. A monitoring plan should include mitigation success criteria and an annual report should be submitted to the CDFG.

Potential Impacts on Burrowing Owls and Proposed Mitigation Measures

This section presents the potential impacts of the project on burrowing owls that may occur during project implementation and the proposed mitigation measures to minimize or eliminate the impacts. Generally, the RSEP will entail ground disturbance activities that may directly or indirectly impact owls. Direct impacts include crushing burrows and any owls that may be inside them. Other potential direct impacts include vehicle collisions with owls or owl collision with above ground infrastructure; contact toxicity with concentrated heavy metals; and loss of nesting and foraging habitat. Indirect impacts may include construction disturbance resulting in nest abandonment, attracting predatory species (e.g., coyote) to the project area, and reduction or elimination of burrowing owl prey base (e.g., ground squirrels).

The proposed project is likely to pose significant or potentially significant impacts on burrowing owl and their habitat, as described below. Mitigation measures to minimize these impacts are also described below.

Impact 1 – Loss of Birds

Impact Description

Project-related ground disturbance activities could result in the death of burrowing owls if burrows crushed by heavy machinery contain owls. Although most of the project area lacks occupied breeding habitat, the results of spring 2009 surveys suggest an estimated seven breeding pairs of owls to be onsite. This potential impact to birds is considered potentially significant.

Mitigation Measures

The project should implement no-work buffers from active burrows during the nesting season (February 1 to August 31) and non-nesting season. Consistent with industry protocol (Attachment A), no-work buffers during the nesting season should be 250 feet and 160 feet during the non-nesting season. It is likely, however, that burrow avoidance during construction may not be feasible. Construction will involve some disturbance (vegetation cutting, erection of heliostats, over the entire 1,410-acre fenced project area. For this reason, passive relocation (see Attachment A) should be implemented during the non-nesting (winter) season (September 1 to January 30) and before construction begins. Because the project site, including the heliostat field, is unlikely to be hospitable or attractive to burrowing owls after project construction, impacted burrows should be compensated off-site as follows:

- Replacement of occupied habitat with occupied habitat: 1.5 times 6.5 (9.75) acres per pair or single bird; or

- Replacement of occupied habitat with habitat contiguous to currently occupied habitat: 2 times 6.5 (13.0) acres per pair or single bird; or
- Replacement of occupied habitat with suitable unoccupied habitat: 3 times 6.5 (19.5) acres per pair or single bird.

The plan (see Impact 2 of this Plan) for passive relocation of owls is subject for final approval by CEC and CDFG.

Impact 2 – Loss of Habitat

Impact Description

The project will result in the loss of suitable owl breeding and foraging habitat. In general, burrowing owl is known to require a minimum of 6.5 acres of contiguous foraging habitat with their burrow site. As recorded in the spring of 2009, up to 7 pairs of burrowing owl may occupy the project area. Therefore, up to 46 acres of owl habitat may be impacted by the proposed project. The overall project area totaling 1,410 acres provides suitable foraging habitat for the species. The loss of potential nesting habitat is considered a significant impact, and the loss of suitable foraging habitat is considered a long-term, potentially significant impact.

Mitigation Measures

Because potential nesting habitat will be affected during project construction, a preconstruction survey no later than 30 days prior to ground disturbance should occur to determine the current status of burrowing owls onsite. If owls are found, they should be passively relocated to an offsite mitigation site following the guidance presented in the Attachment A. Each pair or single owl passively relocated should be provided a minimum of 1 artificial burrow (see Attachment B for representative photographs and drawings of artificial burrows) in off-site areas as deemed appropriate by a qualified biologist in consultation with CEC and CDFG.

If possible, the project should minimize impacts on burrowing owl nesting habitat and avoid passive relocation by implementing no-work buffers from active burrows in areas such as the transmission line route, where impacts to nests would be only temporary. RSE has minimized disturbance to burrowing owl foraging habitat to the extent feasible consolidating project elements in the smallest space practicable. Construction impacts should be minimized by restricting temporary work areas such as staging areas, access routes, and access roads as feasible.

Impact 3 – Disturbance to Burrows

Impact Description

Project construction may result in both short- and long-term disturbance to active owl burrows. Construction equipment and personnel may occur within 160 feet of active burrows during the non-breeding season or within 250 feet of active burrows during the

breeding season. The short-term impacts are considered significant and the long-term impacts are considered potentially significant.

Mitigation Measures

As feasible, construction near occupied burrows in temporary disturbance areas such as the laydown areas and transmission line route should be conducted during the non-breeding season (September 1 to January 31). If construction cannot be timed outside the breeding season, no-work buffers previously described in this Plan should be enforced to protect active burrows during the breeding and non-breeding season. If the no-work buffers of 160 and 250 feet cannot be met, the following should occur:

- A qualified biologist in consultation with CDFG should determine an appropriate buffer distance;
- The protected burrow should be cordoned off from construction activities using temporary fencing, signage, and/or flagging;
- During the non-breeding season, owls should be passively relocated to the mitigation area or other areas outside the construction zone to artificial burrows previously installed by the qualified biologist in consultation with CEC and CDFG. The artificial burrows (see Attachment B) should be installed a minimum of 250 feet from the construction zone.

RSE should also work with a qualified biologist to site the least damaging routes and locations for temporary work areas during construction. These work areas should be positioned in a manner that avoids or minimizes impacts to burrows. To avoid long-term potentially significant impact on burrowing owls, RSE should prohibit access by operations and maintenance staff to nearby off-site mitigation and nesting areas.

Impact 4 – Collisions with Vehicles and Power Infrastructure

Impact Description

The project will result in additional vehicular traffic to the project area during construction, increasing the likelihood of collisions with burrowing owl. Because owls are most active at night, the risk to owls is greater during the dusk to dawn hours. In addition, the project includes a new cylindrical concrete tower totaling 653 feet in height, comprised of a 538-foot-high concrete tower with a 100-foot-tall solar receiver and 15-foot tall crane. The new tower poses a potential above-ground collision and incineration risk to birds including owls during operation. This risk would be more likely during inclement weather or at night when visibility is low. The measures mitigating the effects of vehicular collisions are discussed in this Plan below; however the effects of the above ground and incineration risks are covered separately by the project's *Bird Collision and Incineration Monitoring Plan*.

Mitigation Measures

The RSEP should enforce the following measures:

- Post a 25 mile-per-hour speed limit along all project access roads and routes adjacent to occupied owl habitat.
- Install access roads and routes as far from occupied owl habitat as possible. Concentrate traffic in previously disturbed/developed areas as feasible.
- Conduct project construction during daylight hours only. If work must occur at night, route traffic away from occupied owl habitat to the extent feasible and also adhere to applicable no-work buffers from occupied burrows.

Impact 5 – Exposure to RSEP Evaporation Ponds

Impact Description

Three 5-acre RSEP evaporation ponds to process wastewater discharge from the water treatment system and oil/water separator may be an attractant to burrowing owls as a drinking water source, and also during foraging if insects congregate over the ponded areas. As evaporation occurs, the concentration of mineral constituents in the wastewater discharged to the ponds will increase, posing potentially toxic conditions to wildlife including owls. At a minimum, anti-perching devices should be used around the perimeter of each pond to assist in excluding birds from accessing the edge of the pond to drink the water. Additionally, the 2 feet of freeboard and the 33 percent interior side slopes would make it difficult for perching birds/shore birds to access the water. To monitor the effectiveness of these and any other mitigation measures for avian species including burrowing owl, RSE will implement a separate *Evaporation Pond Bird Mortality Monitoring and Mitigation Plan.* Other potential measures that may be implemented as a bird deterrent include: air cannon, "Bird-B-Gone Balloon," or other deterrent devices. The separate monitoring program will include assessing bird populations at the ponds, and measuring the water quality (including total dissolved solids).

Mitigation Measures

The mitigation measures are outlined separately from this Plan in the *Evaporation Pond Bird Mortality Monitoring and Mitigation Plan.*

Impact 6 – Decreased Prey Base

Impact Description

RSEP maintenance and operations staff may want to control the local rodent population in the immediate area of new facility infrastructure. Rodents could cause damage to equipment by undermining foundations or by infestation of control panels or other electrical enclosures. The burrowing owls' prey base of small rodents (ground squirrels, mice, voles) would be decreased if control methods are used in or near occupied owl habitat, thus having a negative effect on owl survival and reproduction.

Mitigation Measures

RSE should implement a rodent control program only directly around new facility infrastructure (e.g., buildings and heliostats) and should not use biocides outside the project fence line.

Impact 7 – Increased Predation

Impact Description

If the project serves as an attractant to species that prey on burrowing owls, this could increase the predator load on this species. Elevated infrastructure provides perching sites for hawks and other owls and may increase risk to burrowing owls if occupied burrows are nearby. In addition, food-related trash items at the construction site could attract opportunistic wildlife such as coyotes. Coyotes could repeatedly visit the site if trash receptacles placed in outdoor areas are not properly covered and maintained. Construction and operations staff may also attract predatory species by feeding them. All of these impacts are considered potentially significant.

Mitigation Measures

The following measures should be implemented:

- RSEP contractors, personnel, and operations and maintenance staff should be prohibited from feeding wildlife on site.
- Pets should be prohibited construction and operation of the facility.
- The facility should use trash receptacles that cannot be easily opened or toppled over by wildlife. Also, receptacles should be emptied regularly and not be allowed to overflow.
- Encourage burrowing owls not to occupy the facility site by implementing passive relocation and establishing artificial burrow sites outside the facility site.

Mitigation Monitoring

The mitigation measures presented in this Plan are designed to minimize or eliminate the potential adverse impacts of the proposed project on burrowing owl to less than significant levels. Ultimately, the biological resources agencies, including the CEC and CDFG, should review and approval these measures before RSE implements them. Because most of the mitigation measures proposed in the previous section require monitoring to determine if they were implemented properly and to assess their effectiveness, the following monitoring measures should be included as part of this Plan:

- Record impacts to owls during project construction and report these findings to the CEC in the compliance reports.
- During facility operation, provide to the CEC a written annual report describing the current status of burrowing owls in the mitigation area. The report will also include the status and effectiveness of owl passive relocation including if any new artificial burrows are being used by owls.
- Monitor the mitigation area to assess burrowing owl population change at RSEP, including changes in adult and pair numbers in relation to the owl population determined during preconstruction surveys. The results of this population monitoring should be included in the annual report to CEC.

If the owl population in the mitigation area experiences a significant drop, either statistically or in the opinion of a qualified biologist, implement these further measures:

- Determine the sources of the population decline, if possible.
- Implement actions and management activities designed by a qualified owl biologist, in consultation with CEC and CDFG, to mitigate the sources of population decline.
- Continue to monitor owl populations to determine if the new mitigation measures are working to stabilize the population.

Attachment A
Burrowing Owl Survey Protocol and Mitigation Guidelines.

BURROWING OWL SURVEY PROTOCOL AND MITIGATION GUIDELINES

Prepared by:

The California Burrowing Owl Consortium

April 1993

INTRODUCTION

The California Burrowing Owl Consortium developed the following Survey Protocol and Mitigation Guidelines to meet the need for uniform standards when surveying burrowing owl *(Speotyto cunicularia)* populations and evaluating impacts from development projects. The California Burrowing Owl Consortium is a group of biologists in the San Francisco Bay area who are interested in burrowing owl conservation. The following survey protocol and mitigation guidelines were prepared by the Consortium's Mitigation Committee. These procedures offer a decision-making process aimed at preserving burrowing owls in place with adequate habitat.

California's burrowing owl population is clearly in peril and if declines continue unchecked the species may qualify for listing. Because of the intense pressure for development of open, flat grasslands in California, resource managers frequently face conflicts between owls and development projects. Owls can be affected by disturbance and habitat loss, even though there may be no direct impacts to the birds themselves or their burrows. There is often inadequate information about the presence of owls on a project site until ground disturbance is imminent. When this occurs there is usually insufficient time to evaluate impacts to owls and their habitat. The absence of standardized field survey methods impairs adequate and consistent impact assessment during regulatory review processes, which in turn reduces the possibility of effective mitigation.

These guidelines are intended to provide a decision-making process that should be implemented wherever there is potential for an action or project to adversely affect burrowing owls or the resources that support them. The process begins with a four-step survey protocol to document the presence of burrowing owl habitat, and evaluate burrowing owl use of the project site and a surrounding buffer zone. When surveys confirm occupied habitat, the mitigation measures are followed to minimize impacts to burrowing owls, their burrows and foraging habitat on the site. These guidelines emphasize maintaining burrowing owls and their resources in place rather than minimizing impacts through displacement of owls to an alternate site.

Each project and situation is different and these procedures may not be applicable in some circumstances. Finally, these are not strict rules or requirements that must be applied in all situations. They are guidelines to consider when evaluating burrowing owls and their habitat, and they suggest options for burrowing owl conservation when land use decisions are made.

Section 1 describes the four phase Burrowing Owl Survey Protocol. Section 2 contains the Mitigation Guidelines. Section 3 contains a discussion of various laws and regulations that protect burrowing owls and a list of references cited in the text.

We have submitted these documents to the California Department of Fish and Game (CDFG) for review and comment. These are untested procedures and we ask for your comments on improving their usefulness.

SECTION 1 BURROWING OWL SURVEY PROTOCOL

PHASE I: HABITAT ASSESSMENT

The first step in the survey process is to assess the presence of burrowing owl habitat on the project site including a 150-meter (approx. 500 ft.) buffer zone around the project boundary (Thomsen 1971, Martin 1973).

Burrowing Owl Habitat Description

Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat: both natural and artificial burrows provide protection, shelter, and nests for burrowing owls (Henny and Blus 1981). Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures, such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

Occupied Burrowing Owl Habitat

Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can be verified at a site by an observation of at least one burrowing owl, or, alternatively, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one burrowing owl has been observed occupying a burrow there within the last three years (Rich 1984).

The Phase II burrow survey is required if burrowing owl habitat occurs on the site. If burrowing owl habitat is not present on the project site and buffer zone, the Phase II burrow survey is not necessary. A written report of the habitat assessment should be prepared (Phase IV), stating the reason(s) why the area is not burrowing owl habitat.

PHASE II: BURROW SURVEY

1. A survey for-burrows and owls should be conducted by walking through suitable habitat over the entire project site and in areas within 150 meters (approx 500 ft.) of the project impact zone. This 150-meter buffer zone is included to account for adjacent burrows and foraging habitat outside the project area and impacts from factors such as noise and vibration due to heavy equipment which could impact resources outside the project area.

2. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.), and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To efficiently survey projects larger than 100 acres, it is recommended that two or more surveyors conduct concurrent surveys. Surveyors should maintain a minimum distance of 50 meters (approx. 160 ft.) from any owls or occupied burrows. It is important to minimize disturbance near occupied burrows during all seasons.

3. If burrows or burrowing owls are recorded on the site, a map should be prepared of the burrow concentration areas. A breeding season survey and census (Phase III) of burrowing owls is the next step required.

4. Prepare a report (Phase IV) of the burrow survey stating whether or not burrows are present.

5. A preconstruction survey may be required by project-specific mitigations no more than 30 days prior to ground disturbing activity.

PHASE III: BURROWING OWL SURVEYS, CENSUS AND MAPPING

If the project site contains burrows that could be used by burrowing owls, then survey efforts should be directed towards determining owl presence on the site. Surveys in the breeding season are required to describe if, when, and how the site is used by burrowing owls. If no owls are observed using the site during the breeding season, a winter survey is required.

Survey Methodology

A complete burrowing owl survey consists of four site visits. During the initial site visit examine burrows for owl sign and map the locations of occupied burrows. Subsequent observations should be conducted from as many fixed points as necessary to provide visual coverage of the site using spotting scopes or binoculars. It is important to minimize disturbance near occupied burrows during all seasons. Site visits must be repeated on four separate days. Conduct these visits from two hours before sunset to one hour after or from one hour before to two hours after sunrise. Surveys should be conducted during weather that is conducive to observing owls outside their burrows. Avoid surveys during heavy rain, high winds (> 20 mph), or dense fog.

Nesting Season Survey. The burrowing owl nesting season begins as early as February 1 and continues through August 31 (Thomsen 1971, Zam 1974). The timing of nesting activities may vary with latitude and climatic conditions. If possible, the nesting season survey should be conducted during the peak of the breeding season, between April 15 and July 15. Count and map all burrowing owl sightings, occupied burrows, and burrows with owl sign. Record numbers of pairs and juveniles, and behavior such as courtship and copulation. Map the approximate territory boundaries and foraging areas if known.

Survey for Winter Residents (non-breeding owls). Winter surveys should be conducted between December 1 and January 31, during the period when wintering owls are most likely to be present. Count and map all owl sightings, occupied burrows, and burrows with owl sign.

Surveys Outside the Winter and Nesting Seasons. Positive results, (i.e., owl sightings)- outside of the above survey periods would be adequate to determine presence of owls on site. However, results of these surveys may be inadequate for mitigation planning because the numbers of owls and their pattern of distribution may change during winter and nesting seasons. Negative results during surveys outside the above periods are not conclusive proof that owls do not use the site.

Preconstruction Survey. A preconstruction survey may be required by project-specific mitigations and should be conducted no more than 30 days prior to ground disturbing activity.

PHASE IV: RESOURCE SUMMARY, WRITTEN REPORT

A report should be prepared for CDFG that gives the results of each Phase of the survey protocol, as outlined below.

Phase I: Habitat Assessment

1. Date and time of visit(s) including weather and visibility conditions; methods of survey.

2. Site description including the following information: location, size, topography, vegetation communities, and animals observed during visit(s).

3. An assessment of habitat suitability for burrowing owls and explanation.

4. A map of the site.

Phase II: Burrow Survey

1. Date and time of visits including weather and visibility conditions; survey methods including transect spacing.

2. A more detailed site description should be made during this phase of the survey protocol including a partial plant list of primary vegetation, location of nearest freshwater (on or within one mile of site), animals observed during transects.

3. Results of survey transects including a map showing the location of concentrations of burrow(s) (natural or artificial) and owl(s), if present.

Phase III: Burrowing Owl Surveys, Census and Mapping

1. Date and time of visits including weather and visibility conditions; survey methods including transect spacing.

2. Report and map the location of all burrowing owls and owl sign. Burrows occupied by owl(s) should be mapped indicating the number of owls at each burrow. Tracks, feathers, pellets, or other items (prey remains, animal scat) at burrows should also be reported.

3. Behavior of owls during the surveys should be carefully recorded (from a distance) and reported. Describe and map areas used by owls during the surveys. Although not required, all behavior is valuable to document including feeding, resting, courtship, alarm, territorial, parental, or juvenile behavior.

4. Both winter and nesting season surveys should be summarized. If possible include information regarding productivity of pairs, seasonal pattern of use, and include a map of the colony showing territorial boundaries and home ranges.

5. The historical presence of burrowing owls on site should be documented, as well as the source of such information (local bird club, Audubon society, other biologists, etc.).

Burrowing: Owl Survey Protocol

April 1993

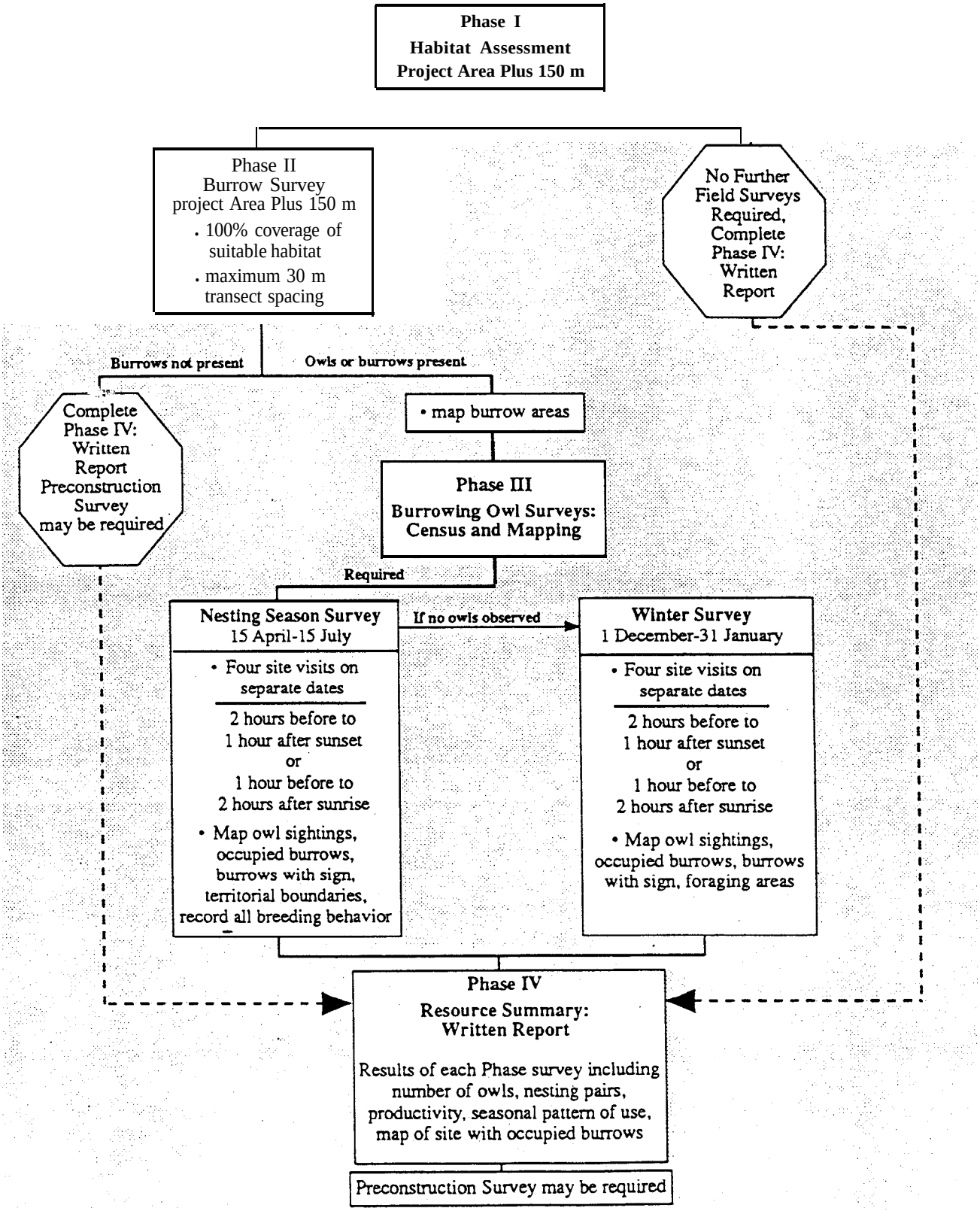


Figure 1.

SECTION 2 BURROWING OWL MITIGATION GUIDELINES

The objective of these mitigation guidelines is to minimize impacts to burrowing owls and the resources that support viable owl populations. These guidelines are intended to provide a decision-making process that should be implemented wherever there is potential for an action or project to adversely affect burrowing owls or their resources. The process begins with a four-step survey protocol (see *Burrowing Owl Survey Protocol)* to document the presence of burrowing owl habitat, and evaluate burrowing owl use of the project site and a surrounding buffer zone. When surveys confirm occupied habitat, the mitigation measures described below are followed to minimize impacts to burrowing owls, their burrows and foraging habitat on the site. These guidelines emphasize maintaining burrowing owls and their resources in place rather than minimizing impacts through displacement of owls to an alternate site.

Mitigation actions should be carried out prior to the burrowing owl breeding season, generally from February 1 through August 31 (Thomsen 1971, Zarn 1974). The timing of nesting activity may vary with latitude and climatic conditions. Project sites and buffer zones with suitable habitat should be resurveyed to ensure no burrowing owls have occupied them in the interim period between the initial surveys and ground disturbing activity. Repeat surveys should be conducted not more than 30 days prior to initial ground disturbing activity.

DEFINITION OF IMPACTS

1. Disturbance or harassment within 50 meters (approx. 160 ft.) of occupied burrows.

2. Destruction of burrows and burrow entrances. Burrows include structures such as culverts, concrete slabs and debris piles that provide shelter to burrowing owls.

3. Degradation of foraging habitat adjacent to occupied burrows.

GENERAL CONSIDERATIONS

1. Occupied burrows should not be disturbed during the nesting season, from February 1 through August 31, unless the Department of Fish and Game verifies that the birds have not begun egg-laying and incubation or that the juveniles from those burrows are foraging independently and capable of independent survival at an earlier date.

2. A minimum of 6.5 acres of foraging habitat, calculated on a 100-m (approx. 300 ft.) foraging radius around the natal burrow, should be maintained per pair (or unpaired resident single bird) contiguous with burrows occupied within the last three years (Rich 1984, Feeney 1992). Ideally, foraging habitat should be retained in a long-term conservation easement.

3. When destruction of occupied burrows is unavoidable, burrows should be enhanced (enlarged or cleared of debris) or created (by installing artificial burrows) in a ratio of 1:1 in adjacent suitable habitat that is contiguous with the foraging habitat of the affected owls.

4. If owls must be moved away from the disturbance area, passive relocation (see below) is preferable to trapping. A time period of at least one week is recommended to allow the owls to move and acclimate to alternate burrows.

5. The mitigation committee recommends monitoring the success of mitigation programs as required in Assembly Bill 3180. A monitoring plan should include mitigation success criteria and an annual report should be submitted to the California Department of Fish and Game.

AVOIDANCE

Avoid Occupied Burrows

No disturbance should occur within 50 m (approx. 160 ft.) of occupied burrows during the non-breeding Season of September 1 through January 31 or within 75 m (approx. 250 ft.) during the breeding Season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird (Figure 2).

MITIGATION FOR UNAVOIDABLE IMPACTS

On-site Mitigation

On-site passive relocation should be implemented if the above avoidance requirements cannot be met. Passive relocation is defined as encouraging owls to move from occupied burrows to alternate natural or artificial burrows that are beyond 50 m from the impact zone and that are within or contiguous to a minimum of 6.5 acres of foraging habitat for each pair of relocated owls (Figure 3). Relocation of owls should only be implemented during the non-breeding season. On-site habitat should be preserved in a conservation easement and managed to promote burrowing owl use of the site.

Owls should be excluded from burrows in the immediate impact zone and within a 50 m (approx. 160 ft.) buffer zone by installing one-way doors in burrow entrances: One-way doors should be left in place 48 hours to insure owls have left the burrow before excavation. One alternate natural or artificial burrow should be provided for each burrow that will be excavated in the project impact zone. The project area should be monitored daily for one week to confirm owl use of alternate burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe or burlap bags should be inserted into the tunnels

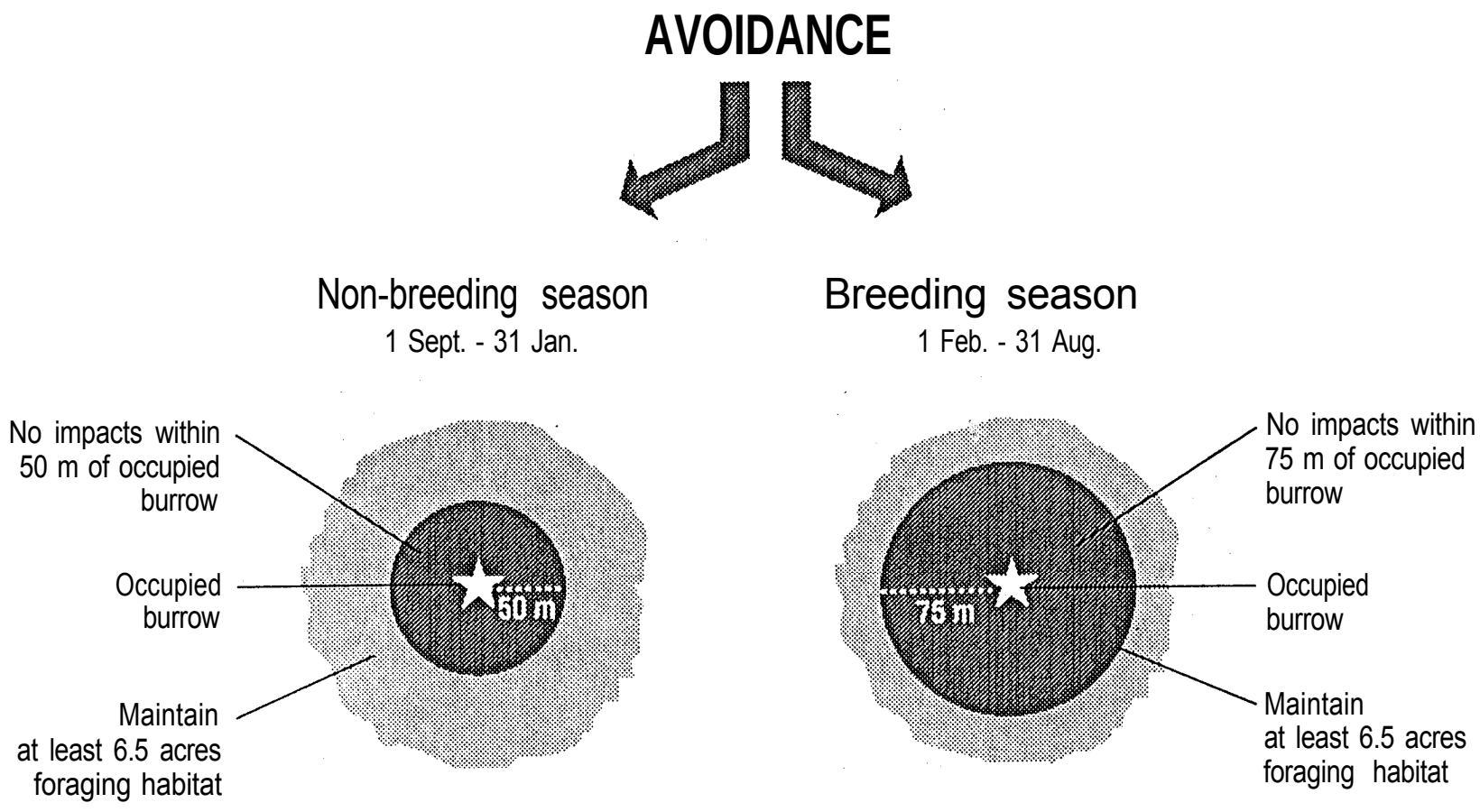


Figure 2. Burrowing owl mitigation guidelines.

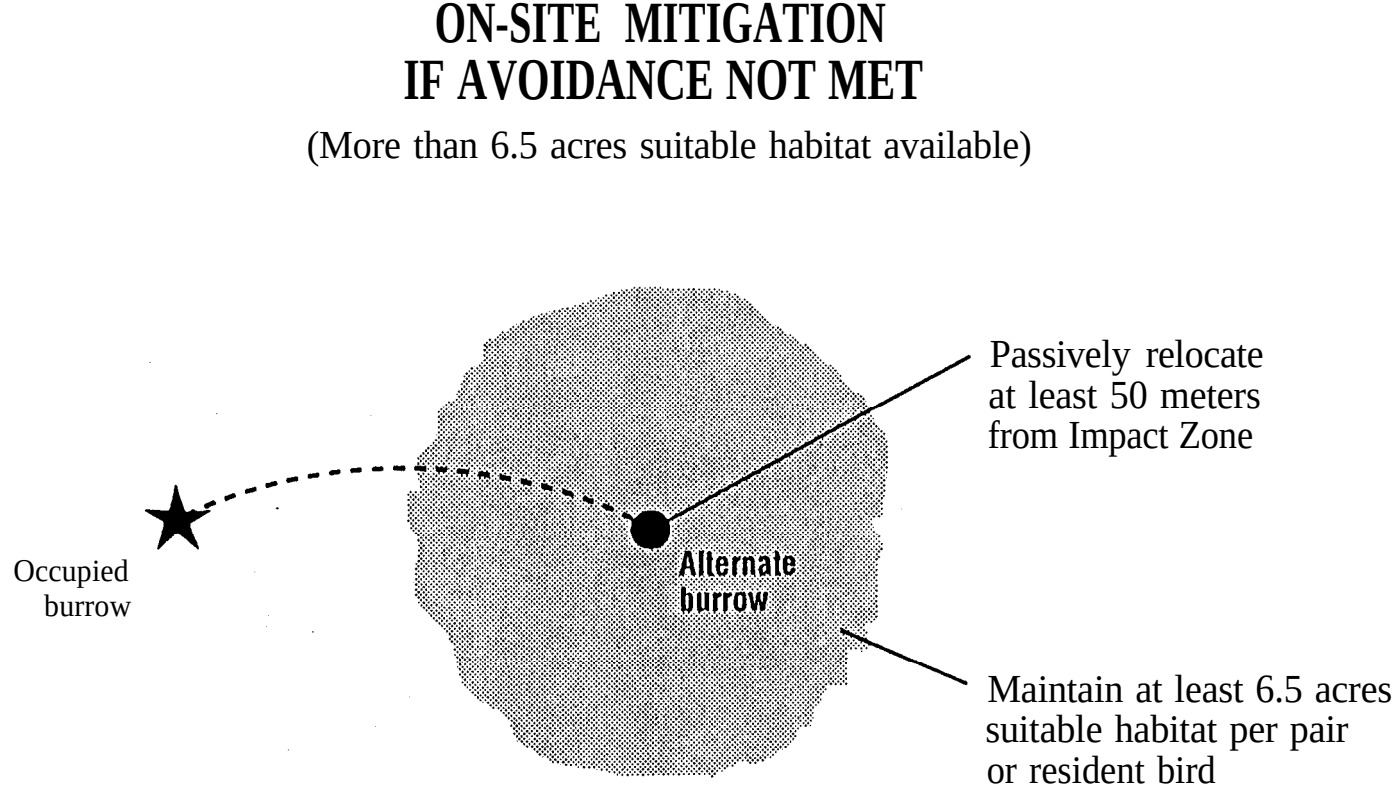


Figure 3. Burrowing owl mitigation guidelines.

during excavation to maintain an escape route for any animals inside the burrow.

Off-site Mitigation

If the project will reduce suitable habitat on-site below the threshold level of 6.5 acres per relocated pair or single bird, the habitat should be replaced off-site. Off-site habitat must be suitable burrowing owl habitat, as defined in the *Burrowing Owl Survey Protocol*, and the site approved by CDFG. Land should be purchased and/or placed in a conservation easement in perpetuity and managed to maintain suitable habitat. Off-site mitigation should use one of the following ratios:

1. Replacement of occupied habitat with occupied habitat: 1.5 times 6.5 (9.75) acres per pair or single bird.

2. Replacement of occupied habitat with habitat contiguous to currently occupied habitat: 2 times 6.5 (13.0) acres per pair or single bird.

3. Replacement of occupied habitat with suitable unoccupied habitat: 3 times 6.5 (19.5) acres per pair or single bird.

SECTION 3 LEGAL STATUS

The burrowing owl is a migratory bird species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter, any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3503, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. Implementation of the take provisions requires that project-related disturbance at active nesting territories be reduced or eliminated during critical phases of the nesting cycle (March 1 - August 15, annually). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) or the loss of habitat upon which the birds depend is considered "taking" and is potentially punishable by fines and/or imprisonment. Such taking would also violate federal law protecting migratory birds (e.g., MBTA).

The burrowing owl is a Species of Special Concern to California because of declines of suitable habitat and both localized and statewide population declines. Guidelines for the Implementation of the California Environmental Quality Act (CEQA) provide that a species be considered as endangered or "rare" regardless of appearance on a formal list for the purposes of the CEQA (Guidelines, Section 15380, subsections b and d). The CEQA requires a mandatory findings of significance if impacts to threatened or endangered species are likely to occur (Sections 21001(c), 21083. Guidelines 15380, 15064, 15065). Avoidance or mitigation must be presented to reduce impacts to less than significant levels.

CEQA AND SUBDIVISION MAP ACT

CEQA Guidelines Section 15065 directs that a mandatory finding of significance is required for projects that have the potential to substantially degrade or reduce the habitat of, or restrict the range of a threatened or endangered species. CEQA requires agencies to implement feasible mitigation measures or feasible alternatives identified in EIR's for projects which will otherwise cause significant adverse impacts (Sections 21002, 21081, 21083; Guidelines, sections 15002, subd. (a)(3), 15021, subd. (a)(2), 15091, subd. (a).).

To be legally adequate, mitigation measures must be capable of "avoiding the impact altogether by not taking a certain action or parts of an action"; "minimizing impacts by limiting the degree or magnitude of the action and its implementation"; "rectifying the impact by repairing, rehabilitating or restoring the impacted environment"; "or reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action." (Guidelines, Section 15.370).

Section 66474 (e) of the Subdivision Map Act states "a legislative body of a city or county shall deny approval of a tentative map or parcel map for which a tentative map was not required, if

it makes any of the following findings:... (e) that the design of the subdivision or the proposed improvements are likely to cause substantial environmental damage or substantially and avoidably injure fish and wildlife or their habitat". In recent court cases, the court upheld that Section 66474(e) provides for environmental impact review separate from and independent of the requirements of CEQA (Topanga Assn. for a Scenic Community v. County of Los Angeles, 263 Cal. Rptr. 214 (1989).). The finding in Section 66174 is in addition to the requirements for the preparation of an EIR or Negative Declaration.

LITERATURE CITED

Feeney, L. 1992. Site fidelity in burrowing owls. Unpublished paper presented to Raptor Research Annual Meeting, November 1992. Seattle, Washington.

Haug, E. A. and L. W. Oliphant. 1990. Movements, activity patterns, and habitat use of burrowing owls in Saskatchewan. J. Wildlife Management 54:27-35.

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Rich, T. 1984. Monitoring burrowing owl populations: Implications of burrow re-use. Wildlife Society Bulletin 12: 178- 180.

Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. Condor 73: 177-192.

Zam, M. 1974. Burrowing owl. U. S. Department of Interior, Bureau of Land Management. Technical Note T-N 250. Denver, Colorado. 25pp.

Attachment B
Example Drawing of an Artificial Burrow and Representative Photographs of the Installation Process

Figure 1. Construction of the Artificial Burrows

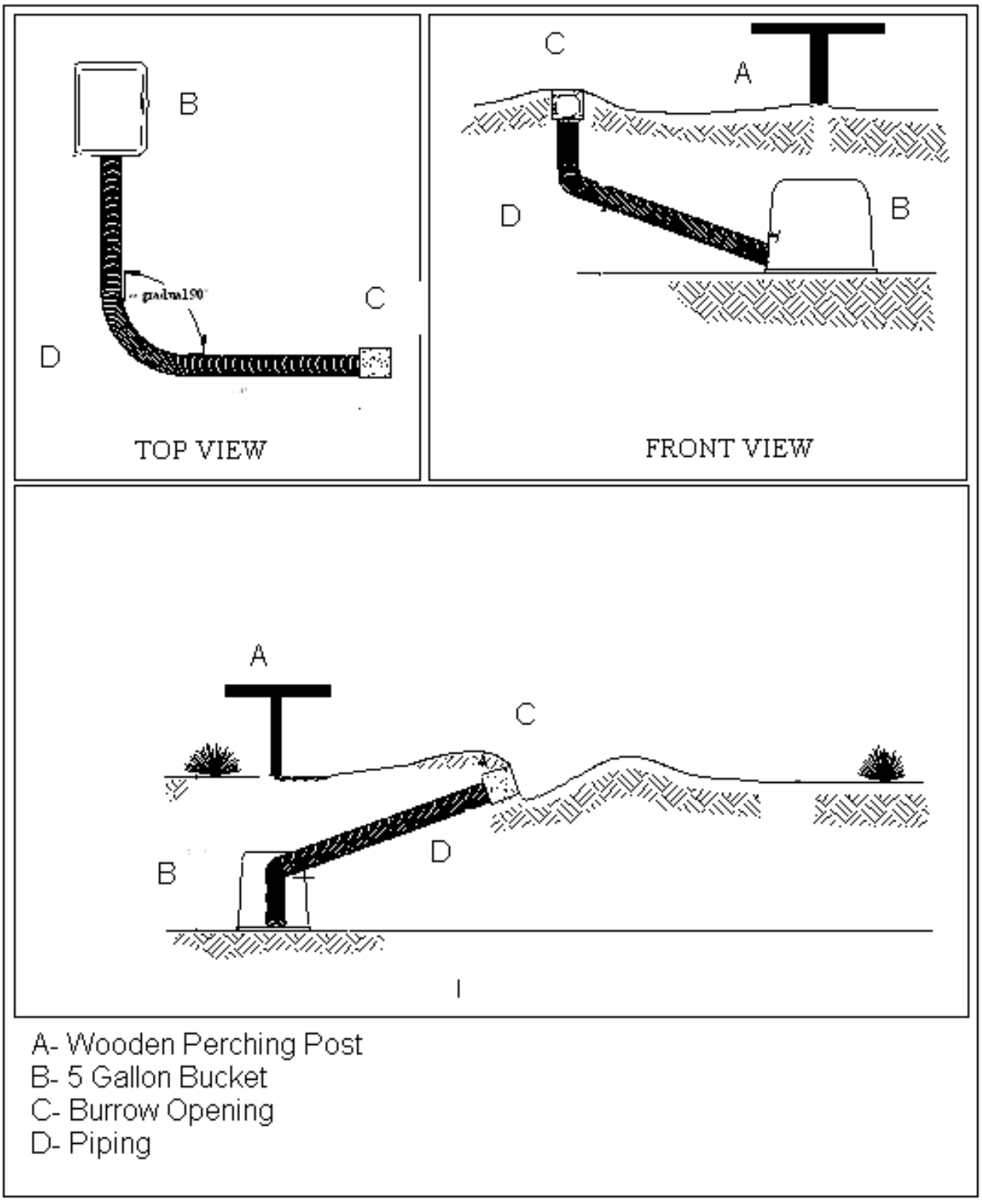

Figure 2. Recommended Layout for an Artificial Burrow

Source: Alexander, A.K., M.R., Sachschewsky, & C.A. Duberstein. 2005. Use of Artificial Burrows by Burrowing Owl (Athene cunicularia) at the HAMMER Facility on the U.S. Department of Energy Hanford Site, Pacific Northwest National Laboratory. September.

Attachment DR56-1
Mitigation and Monitoring Plan for Bird Collision and Incineration and Evaporation Pond Bird Mortality

Draft

Mitigation and Monitoring Plan

for

Bird Collision and Incineration and Evaporation Pond Bird Mortality

Response to CEC Staff Data Requests #56 and #58

For the

Rice Solar Energy Project

(09-AFC-10)

Submitted to the:

California Energy Commission

Submitted by:

SOLARRESERVE

With Technical Assistance by:

CH2MHILL

Sacramento, California

April 2010

Contents

Introduction

The Rice Solar Energy Project (RSEP or project) may have direct and indirect impacts on birds and their habitats. RSEP is subject to federal and state laws designed to protect birds and their habitats. The Migratory Bird Treaty Act (MBTA) protects most birds in the United States. The Bald and Golden Eagle Protection Act (BGEPA) provides protection for bald and golden eagles. Several species that may occur at the site are protected as Bureau of Land Management (BLM) Sensitive Species. Additional species are protected as California Species of Concern and under the California Fully Protected Species, Fish and Game Code.

"Take" under the MBTA is defined as to "pursue, hunt, take, capture, kill…possess, offer for sale, sell…purchase…ship, export, import…transport or cause to be transported…any migratory bird, any part, nest, or eggs of any such bird…." The MBTA does not authorize "take" of migratory birds; however, enforcement requires violations to be "knowingly" committed. RSE will take measures to minimize the likelihood of injury or death of birds as a result of construction or operation of the project. This plan outlines monitoring and measures designed to protect birds.

Plan Purpose

This document provides a conceptual Mitigation and Monitoring Plan (Plan) for potential bird collision with project structures, incineration, and impacts from the evaporation ponds. This Plan is being provided in response to California Energy Commission (CEC) Staff Data Adequacy Requests #56 and #58 for the proposed RSEP (09-AFC-10). The primary purpose of this Plan is to provide a strategy that would provide an opportunity for the protection of birds from the construction and operational impacts of the project. This plan also fulfills some of the project mitigation measures identified in the Application for Certification (AFC) document filed with the CEC on October 21, 2009. The mitigation measures being proposed in this Plan are subject to final approval by the resource agencies, including the California Department of Fish and Game (CDFG) and CEC.

Project Description

Rice Solar Energy, LLC, (RSE) a wholly owned subsidiary of SolarReserve, LLC, proposes to construct, own, and operate the project. The RSEP will be capable of producing approximately 450,000 megawatt hours (MWh) of renewable solar energy annually, with a nominal net generating capacity of 150 megawatts (MW).

The facility will use concentrating solar power (CSP) technology, with a central receiver tower and an integrated thermal storage system. The RSEP's technology generates power from sunlight by focusing energy from a field of sun-tracking mirrors called heliostats onto

a central receiver. Liquid salt,[1] which has viscosity and appearance similar to water when melted, is circulated through tubes in the receiver, collecting the energy gathered from the sun. The heated salt is then routed to an insulated storage tank where it can be stored with minimal energy losses. When electricity is to be generated, the hot salt is routed to heat exchangers (a steam generation system). The steam is then used to generate electricity in a conventional steam turbine cycle. After exiting the steam generation system, the salt is sent to the cold salt thermal storage tank, and the cycle is repeated. The salt storage technology was demonstrated successfully at the U.S. Department of Energy–sponsored 10-MW *Solar Two* project near Barstow, California, in the 1990s.

Project Location

The RSEP site is a privately owned parcel in eastern Riverside County. The site is adjacent to State Route (SR) 62, which parallels a portion of the Arizona-California Railroad and the Colorado River Aqueduct, near the junction of SR 62 and Blythe-Midland Road, and near the sparse remains of the abandoned town of Rice, California. The nearest occupied residence is approximately 15 miles northeast at the rural crossroads community of Vidal Junction, California. The nearest town is Parker, Arizona (population 3,181), approximately 32 miles east. A small permanent residential settlement is located at the Metropolitan Water District of Southern California's Iron Mountain Pumping Plant, approximately 17 miles west.

The RSEP is within a larger 3,324-acre privately owned holding (the ownership property). Within this larger property, the RSEP is sited within a new square-shaped parcel (the project parcel) that will be created by merging what are currently four different assessor's parcels, each a discrete section (square mile) of land, resulting in a single 2,560-acre parcel. Within this project parcel will be the administration buildings area, heliostat field with power block, and evaporation pond areas, totaling 1,410 acres, that will be surrounded by a security fence (collectively, the project site or facility site). Areas outside the facility site but within the project parcel will not be fenced, developed, or disturbed as part of the RSEP.

Project Construction and Schedule

Construction of the generating facility, from site preparation and grading to commercial operation, is expected to occur from the first quarter of 2011 to the third quarter of 2013 (30 months total). Major milestones are listed in Table 1.

TABLE 1
Project Schedule Major Milestones

Activity	Date
Begin construction	First quarter 2011
Begin startup and testing	First quarter 2013
Begin commercial operation	Third quarter 2013

[1] The salt is a mixture of sodium nitrate (a common ingredient in fertilizer) and potassium nitrate (a fertilizer and food additive). These mineral products will be mixed onsite as received directly from mines in solid crystallized form and used without additives or further processing other than mixing and heating.

There will be a peak workforce of approximately 438 construction craft people, supervisory, support, and construction management personnel on site during construction. The peak construction site workforce level is expected to occur between months 8 and 20.

Construction activities will generally occur between 5 a.m. and 7 p.m. on weekdays and Saturdays. Construction at times may occur on a 24-hour, 7-days-per-week basis to compensate for schedule deficiencies, to work around extreme midday heat during summer months and other extreme weather events, or to complete critical construction activities (e.g., pouring concrete at night during hot weather, or working around time-critical shutdowns and constraints). During the commissioning phase of the project, some limited work activities may continue around the clock.

Existing RSEP Site Conditions

Habitat and Vegetation Communities

Sonoran creosote bush scrub, the most prevalent vegetation community in the Colorado Desert, occurs throughout the project area. The dominate shrub is creosote bush (*Larrea tridentata*). Other shrubs species present include burrobrush (*Hymenoclea salsola*), burro-weed (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), and white rhatany (*Krameria grayi*). Herbaceous species present include *Calycoseris wrightii*, pebble pincushion (*Chaenactis carphoclinia* var. *carphoclinia*), desert dandelion (*Malacothrix glabrata*), devil's lettuce (*Amsinckia tessellata*), *Cryptantha nevadensis*, mustard (*Brassica tournefortii*), rattlesnake weed (*Chamaesyce polycarpa* var. *hirtella*), Arizona lupine (*Lupinus arizonicus*), *Camissonia boothii* ssp. *condensata*, plantain (*Plantago ovata*), and Mediterranean grass (*Schismus barbatus*).

Although considered to be within the West Basin of the Colorado River, which drains primarily into the Salton Sea Trough, Rice Valley is a sink within no broader hydrological connectivity. Rice Valley has a small watershed and lacks any major washes. Streams, washes, and playas are dry most of the year, with surface water only present after storm events. Although Rice Valley is a sink, there are no perennial surface water sources and there is no evidence that a lake ever formed in the valley during wetter climatic periods. No wetlands or waters were identified in the project area.

Baseline Avian Use

The project area likely hosts a variety of bird species common to the eastern Colorado Desert. Bird species observed on site are listed in Table 2. A list of special status bird species with the potential to occur on the site is presented in Table 3. Four of the 18 species observed during wildlife surveys conducted between April 18 and May 18, 2009, are raptors: turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), and burrowing owl (*Athene cunicularia*). Of these, the burrowing owl and prairie falcon are migratory, and the turkey vulture and red-tailed hawk may be resident. Burrowing owls eat mainly insects and spend most of their time relatively near the ground surface.

TABLE 2
Bird Species Observed in the RSEP during the 2009 Desert Tortoise Protocol Surveys and a Site Visit on March 4, 2010

Scientific Name	Common Name
Cathartes aura	turkey vulture
Buteo jamaicensis	red-tailed hawk
Falco mexicanus	prairie falcon
Zenaida asiatica	white-winged dove
Athene cunicularia	burrowing owl
Chordeiles acutipennis	lesser nighthawk
Phalaenoptilus nuttallii	common poorwill
Lanius ludovicianus	loggerhead shrike
Corvus corax	common raven
Eremophila alpestris	horned lark
Hirundo rustica	barn swallow
Mimus polyglottos	northern mockingbird
Dendroica townsendi	Townsend's warbler
Wilsonia pusilla	Wilson's warbler
Piranga ludoviciana	western tanager
Amphispiza bilineata	black-throated sparrow
Xanthocephalus xanthocephalus	yellow-headed blackbird
Molothrus ater	brown-headed cowbird
Sayornis saya	Say's phoebe
Circus cyaneus	northern harrier
Carpodacus mexicanus	house finch

Starting April 2010, RSEP will begin bird point count surveys in the project area to build on what is known for the project area by determining the relative abundance and temporal distribution of resident and migratory birds. These surveys will have two phases: (1) survey during the nesting seasons in April and (2) survey during the wintering season between November and January. The information resulting from the bird point count surveys will be used to help RSE determine the timing of post-construction surveys under this Plan.

TABLE 3
Special-status Bird Species Occurring or Potentially Occurring in the Rice Solar Energy Project Area

Common Name	Scientific Name	Status[a]	Season[b]	Primary Habitat[c]	Potential Occurrence in Project Area	Comments
Bendire's thrasher	*Toxostoma bendirei*	BCC BLM MBTA BCC CSC IUCN: VU	SUMR	Breeding range includes southeastern California and southern Nevada, Arizona, and western New Mexico. Winters in southern Arizona and northwestern Mexico. Associated with open desert areas with widely spaced large shrubs, cacti, and trees.	**Moderate**. According to the California Natural Diversity Database (CNDDB), Bendire's thrasher has been observed immediately north of the Rice Valley. Although it was not observed during the April–May 2009 desert tortoise surveys, the habitat makes it reasonable to conclude that this bird could occur in the project area and could be directly or indirectly affected by construction and operation of RSEP. The Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) distribution map for Bendire's thrasher does not include the RSEP area.	Nests are typically located in a cactus or shrub. Often mistaken for a curved-bill thrasher (*Toxostoma curvirostre*), but distinctive from other thrashers by behavior of flying from bush to bush whereas other thrashers rarely fly.
Brown-crested flycatcher	*Myiarchus tyrannulus*	MBTA DFG: WL	SUMR	Associated with open woodland habitat in the southeastern U.S. and southward to South America. Individuals breeding in the U.S. typically migrate to Mexico or southern Florida in the winter.	**Low.** Rice Valley has some dry desert wash woodlands but not the open woodland habitat where the brown-crested flycatcher would be found. The Rice Valley does not include large trees or cacti with breeding opportunities for cavity nesters. They have the potential to occur along the nearby Colorado River, but the project is unlikely to have any indirect effects on the bird or its habitat. There is potential that this bird could migrate through Rice Valley.	Typically nest in tree cavities.

TABLE 3
Special-status Bird Species Occurring or Potentially Occurring in the Rice Solar Energy Project Area

Common Name	Scientific Name	Status[a]	Season[b]	Primary Habitat[c]	Potential Occurrence in Project Area	Comments
Crissal thrasher	*Toxostoma crissale*	MBTA BCC CSC	RES	The deserts of the southwestern U.S. are the northern boundary of their range which extends southward into central Mexico. In the southwestern U.S. this species is typically associated with desert washes and riparian thickets in the valleys of the Colorado River and Rio Grande.	**Low.** Rice Valley has some dry desert wash woodlands but not the dense shrubby habitat where the crissal thrasher would be expected to be found. They have the potential to occur along the nearby Colorado River, but the project is unlikely to have any indirect effects on the bird or its habitat. The NECO distribution map for the crissal thrasher does not include the RSEP area.	Little is known about this species.
Elf owl	*Micrathene whitneyi*	MBTA BCC CE	SUMR	Found throughout the southwestern U.S. with the majority of its range in central Mexico. Nests in deciduous tree and cactus cavities. Most common in deserts with giant saguaro (*Carnegiea gigantea*). According to the NECO, the elf owl is only known to occur along the Colorado River Valley in the spring and summer.	**Low.** May pass through the Rice Valley or forage there. There are no appropriately sized cavity trees or cacti in the Rice Valley for this species to nest in. The NECO distribution map for the elf owl does not include the RSEP area.	Diet primarily arthropods, including scorpions. Breeding typically begins in April. Depend on woodpeckers to create nest cavities. Year-round resident in some areas of its range but individuals nesting in southwestern California likely migrate south into Mexico for the winter. Second smallest owl species in the world.
Ferruginous hawk	*Buteo regalis*	BLM BCC MBTA DFG: WL	WNTR	This raptor is most common in the open semiarid habitats throughout the Great Basin and the Great Plains. However, they breed from Canada south to Arizona and east toward Oklahoma. Winter in the southwestern U.S. down to central Mexico. Nests sites can be on rocky outcrops, trees, on the ground, and on structures like power poles.	**High**. The project area may be slightly south of this species' expected breeding range. Rice Valley and the surrounding area are typical of the kind of open habitat where ferruginous hawks would likely overwinter. This hawk likely migrates through the Rice Valley. The NECO distribution map for the ferruginous hawk includes the entire RSEP area.	Largest hawk in the U.S. Sometimes mistaken for a golden eagle. Usually lays eggs between February and July.

TABLE 3
Special-status Bird Species Occurring or Potentially Occurring in the Rice Solar Energy Project Area

Common Name	Scientific Name	Status[a]	Season[b]	Primary Habitat[c]	Potential Occurrence in Project Area	Comments
Gila woodpecker	*Melanerpes uropygialis*	BCC MBTA CE	RES	Range is primarily in southern Arizona but has been found in extreme southeastern California. Found in typical Sonoran Desert low desert scrub communities but closely associated with saguaro cacti. Typically nest in the cavities of the saguaro but will also use mesquite trees or any available cavity. According to the NECO, the Gila woodpecker is currently only known from a few scattered groups along the Colorado River and may be expected up to a mile up desert riparian washes with hydrologic connectivity with the Colorado River.	**Low**. The site does not include saguaro cacti and lacks large trees that would provide appropriate cavity nests. The NECO distribution map for the Gila woodpecker does not include the RSEP area but does include a small pocket of identified habitat immediately south of the proposed generator tie-line interconnection point.	Cavities excavated by Gila woodpeckers are often later used by elf owls. Diet is also closely linked to the saguaro. This species is an important saguaro pollinator.
Gilded flicker	*Colaptes chrysoides*	BCC MBTA CE	RES	Has a similar range and life history to the Gila woodpecker. A cavity nester typically associated with the saguaro cactus forests of the Sonoran Desert. Also found in the Yuma and Colorado Deserts.	**Low**. The site does not include saguaro cacti and lacks large trees that would provide appropriate cavity nests.	
Golden eagle	*Aquila chrysaetos*	BLM FSC BCC MBTA CSC FP CDF: S DFG: WL	RES	Open country, rolling foothills, mountain areas, and desert; breeds on overhanging ledges, high cliff sites, and large trees. According to the NECO, there are few known golden eagle nest sites in the NECO Planning Area, but the species does migrate through the Colorado Desert in the spring and fall, and some likely winter there.	**Moderate**. Golden eagles have a strong likelihood of nesting in the adjacent mountains, and are likely to use the project area for foraging. The NECO distribution map for the golden eagle includes the entire RSEP area.	

TABLE 3
Special-status Bird Species Occurring or Potentially Occurring in the Rice Solar Energy Project Area

Common Name	Scientific Name	Status[a]	Season[b]	Primary Habitat[c]	Potential Occurrence in Project Area	Comments
Hepatic tanager	*Piranga flava*	CSC MBTA DFG: WL	RES, SUMR	Range includes the southwestern U.S. down to Argentina. Typically breeds in open pine (*Pinus* sp.) and pine-oak (*Quercus* sp.) forests.	**Low**. More likely to occur in higher elevations such as desert mountain tops with white fir pinon forests. The western tanager, a similar species, observed during the April–May 2009 desert tortoise surveys was likely migrating through the Rice Valley. There is potential that the hepatic tanager could migrate through Rice Valley.	Habitat described as similar to the western tanager. Typically travel to the southern part of their range in the winter but sometimes remain in the northern breeding range. "Hepatic" is a reference to the male's liver-red colored plumage.
LeConte's thrasher	*Toxostoma lecontei*	BLM FSC BCC MBTA CSC	RES	Range includes the deserts of the southwestern U.S. and northwestern Mexico. May be most common in the Gila and Colorado River valleys. Often associated with sparsely vegetated low elevation areas where they nest in shrubs. According to the NECO, this bird species is likely distributed throughout the Colorado Desert.	**High/Moderate**. According to the CNDDB, LeConte's thrasher has been observed in the Rice Valley. Although it was not observed during the April–May 2009 desert tortoise surveys, habitat makes it reasonable to conclude that this bird could occur in the project area and could be directly or indirectly affected by construction and operation of RSEP. The NECO distribution map for LeConte's thrasher includes the entire RSEP area.	Nesting typically between March and April. Sometimes group in loose bands of LeConte's thrashers following breeding.
Loggerhead shrike	*Lanius ludovicianus*	FSC MBTA CSC	RES	Desert resident; primarily of open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats with adequate hunting perches.	**Present.** Observed in project area during 2009 tortoise surveys. Potential shrub nesting on proposed solar site and within generator tie-line corridor.	Largely nonmigratory and has been known to defend year-round territories. Nests are typically well concealed and built in dense shrubs or trees. In California the breeding period typically begins in March and may extend into August.

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Common Name	Scientific Name	Status[a]	Season[b]	Primary Habitat[c]	Potential Occurrence in Project Area	Comments
Mountain plover	*Charadrius montanus*	BLM MBTA CSC BCC IUCN: NT	WNTR	Primarily a Great Plains breeding bird whose range extends from Montana to Mexico. Often associated with disturbed prairie or semi-desert habitat. Typically winters in the southern part of the range from Texas west to the Central Valley of California. Most individuals are thought to winter in the Imperial Valley. In the Imperial Valley the plover is associated with open grassy fields, grazed agriculture, and alfalfa.	**Low**. Although the shrub community in the Rice Valley is fairly open and sparse, the mountain plover is more likely to be found in the agricultural areas along the Colorado River to the east. There is potential that this bird could migrate through Rice Valley. The NECO distribution map for the mountain plover does not include the RSEP area.	Not known to breed in California. Often arrive in wintering habitat in October and leave between February and March.
Prairie falcon	*Falco mexicanus*	MBTA BCC CSC DFG: WL	RES	Occupies a large range that includes much of western and central North America. Typically associated with open habitat near mountainous areas or cliffs. Usually nest on cliffs.	**Present.** Prairie falcon nest sites have been identified in the CNDDB in the mountains surrounding Rice Valley. The species was observed during the April–May 2009 desert tortoise surveys. Falcons nesting in the nearby mountains likely forage in Rice Valley. This short distance migrant may be present year round in the Rice Valley area. The NECO distribution map for the prairie falcon includes the entire RSEP area.	Egg laying typically begins in March. Some individuals remain residents, some complete short distance migrations, move up or down in elevation, or migrate as far south as central Mexico. Winter population in Colorado Desert may be larger than the breeding season population.
Southwestern willow flycatcher	*Empidonax trailii extimis*	FE MBTA CE	SUMR	The range of this subspecies extends northward to Owens Valley and south to the Colorado River. Closely associated with riparian thickets, in particular with its namesake willow vegetation. Occasionally found breeding on the Colorado River. Migrate south toward Central America in the winter.	**Low.** Rice Valley has some dry desert wash woodlands but not the true riparian habitat where the willow flycatcher would be found. They have the potential to occur along the nearby Colorado River, but the project is unlikely to have any indirect effects on the bird or its habitat. There is potential that this bird could migrate through Rice Valley.	The breeding season typically begins between May and June. Winter migration typically begins in August.

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Common Name	Scientific Name	Status[a]	Season[b]	Primary Habitat[c]	Potential Occurrence in Project Area	Comments
Summer tanager	*Piranga rubra*	MBTA CSC	SUMR	For the western U.S., the breeding range extends as far north as the southeastern deserts. Primarily associated with forested areas in the eastern U.S. Migrates to Central America and northern South America for the winter.	**Low.** Rice Valley has some dry desert wash woodlands but not the wooded habitat where the summer tanager would be expected to be found. They have the potential to occur along the nearby Colorado River, but the project is unlikely to have any indirect effects on the bird or its habitat. There is potential that this bird could migrate through Rice Valley.	Only entirely red bird in North America. Specialize in eating bees and wasps.
Swainson's hawk	*Buteo swainsoni*	MBTA CT	SUMR	Breeding range includes open habitat from western Canada to northern Mexico. In California, breeding primarily occurs in the Great Basin and Central Valley but also includes the California desert. Winter in southern South America.	**High/Moderate.** Swainson's hawks could be observed migrating through Rice Valley and possibly even nesting near the Rice Valley area. The project footprint lacks any sizeable trees suitable for nesting; however, this hawk could nest on nearby power poles. This species may be more likely to nest closer to the Colorado River because it is more often associated with riparian habitat and agricultural areas.	Often arrives in breeding grounds later than other raptors. Likely to arrive in southern California for the breeding season between February and March. Typically nest in trees. Diet typically switches from small mammals to insects following the breeding season. Observations appear to be increasing in the southern California desert. Often travel in large flocks when migrating south for the winter.
Vermilion flycatcher	*Pyrocephalus rubinus*	CSC MBTA	SUMR	Wide range includes the southwestern U.S. south through Central America. Typically associated with riparian habitat.	**Low.** Rice Valley has some dry desert wash woodlands but not the true riparian habitat where the vermilion flycatcher would be found. They have the potential to occur along the nearby Colorado River, but the project is unlikely to have any indirect effects on the bird or its habitat. There is potential that this bird could migrate through Rice Valley. The NECO distribution map for the vermillion flycatcher does not include the RSEP area.	Winters in southern part of the range.

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Special-status Bird Species Occurring or Potentially Occurring in the Rice Solar Energy Project Area

Common Name	Scientific Name	Status[a]	Season[b]	Primary Habitat[c]	Potential Occurrence in Project Area	Comments
Western burrowing owl	*Athene cunicularia hypugaea*	FSC BLM MBTA BCC CSC	RES	Habitat includes open grassland with fossorial mammal burrows, often associated with ground squirrels.	**Present.** Typical burrowing owl whitewash was observed in front of burrows in the proposed solar generation site during 2009 tortoise surveys. The NECO distribution map for the burrowing owl includes the entire RSEP area.	Use medium to large-sized mammal and tortoise burrows for cover and natal dens. Breeding season is typically from February through August.
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FC FSS MBTA BCC CE	SUMR	Range includes much of the western U.S. and extends from Canada through Mexico. Close association with well-developed riparian habitat for breeding.	**Low.** Rice Valley has some dry desert wash woodlands but not the true riparian habitat where the yellow-billed cuckoo would be found. They have the potential to occur along the nearby Colorado River, but the project is unlikely to have any indirect effects on the bird or its habitat. There is some potential that this bird could migrate through Rice Valley.	Currently found in only a few locations in California including along the Colorado River near Blythe. Will arrive at breeding locations anywhere between April and June. Nests are typically in willow (*Salix* sp.). Little is known about their migration, but they usually leave their breeding habitat between July and September.
Willow flycatcher	*Empidonax trailii*	MBTA FSS CE	WNTR	This species breeds in the Sierra Nevada, but according to the NECO, migrates through or even winters in the Colorado Desert. Migrating or wintering flycatchers would likely visit riparian thickets near springs or along riparian corridors.	**Low.** Rice Valley has some dry desert wash woodlands but not the true riparian habitat where the willow flycatcher would be found. They have the potential to occur along the nearby Colorado River, but the project is unlikely to have any indirect effects on the bird or its habitat. There is potential that this bird could migrate through Rice Valley.	

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Common Name	Scientific Name	Status[a]	Season[b]	Primary Habitat[c]	Potential Occurrence in Project Area	Comments
Yellow warbler	*Dendroica petechia*	MBTA CSC	SUMR WNTR	Range widespread throughout North America and down to northern South America. Typically associated with riparian habitat. Likely both breeding and wintering birds in southeastern California. According to the NECO, this warbler is extirpated from the California side of the Colorado River Valley but likely migrates through the area between March and April and then again between September and October.	**Low.** Rice Valley has some dry desert wash woodlands but not the true riparian habitat where the yellow warbler would be found. They have the potential to occur along the nearby Colorado River, but the project is unlikely to have any indirect effects on the bird or its habitat. There is potential that this bird could migrate through Rice Valley. The NECO distribution map for the yellow warbler does not include the RSEP area.	Typically arrive in breeding habitat between April and May. Begin to migrate south between July and August. Typically nest in trees.
Yellow-breasted chat	*Icteria virens*	MBTA CSC	SUMR	Breeding range is widespread from the southern plains of Canada to central Mexico. Migrate to Mexico and Central America in the winter. Associated with dense brushy riparian habitats.	**Low.** Rice Valley has some dry desert wash woodlands but not the dense brushy riparian habitat where the yellow-breasted chat would be found. They have the potential to occur along the nearby Colorado River, but the project is unlikely to have any indirect effects on the bird or its habitat. There is potential that this bird could migrate through Rice Valley.	
Yuma clapper rail	*Rallus longirostris yumanensis*	FE CT, FP	RES	Associated with freshwater marshes with cattail or bulrush. Recent extension of range into lower Colorado River. Closest occupied habitat to the project area includes areas around the Salton Sea and along the Lower Colorado River, primarily within Imperial County.	**Low.** The Rice Valley and surrounding valleys and mountain ranges are arid and include dry desert wash woodlands but not marsh habitats that would support the Yuma clapper rail. It is unlikely that the proposed project would directly or indirectly affect this species.	Diet includes crayfish, small fish, frogs, and aquatic invertebrates. Most individuals are not migratory. Nesting between May through June. No designated or proposed critical habitat.

TABLE 3
Special-status Bird Species Occurring or Potentially Occurring in the Rice Solar Energy Project Area

Common Name	Scientific Name	Status[a]	Season[b]	Primary Habitat[c]	Potential Occurrence in Project Area	Comments

Notes:
[a] Federal, state, and/or other listing designation of protected species.
[b] Blooming period for plants. Season of use for animals. RES=Resident; SUMR=Summer; WNTR=Winter; rare visitor.
[c] Most likely habitat association.

Federal Status
FE = federally listed as endangered
FC = federal candidate species for listing
FSC = federal species of concern
MBTA = species protected by the Migratory Bird Treaty Act
BCC = bird of conservation concern
BLM = BLM sensitive species
FSS = U.S. Forest Service sensitive species
State Status
CE = California listed as endangered
CT = California listed as threatened
FP = fully protected species
CSC = California species of special concern
DFG: WL = Department of Fish and Game Watch List species
CDF: S = California Department of Forestry and Fire Protection sensitive species
Other Status Codes
International Union for Conservation of Nature (IUCN):VU = vulnerable species
IUCN: NT = Near threatened species

Bird Collision and Bird Incineration Monitoring

Background

Case Study

The Solar One project in the Mojave Desert near Barstow, California, was a prototype and pilot project to demonstrate the concentrating solar tower-and-heliostat technology that is being developed at the RSEP and was a precursor to the Solar Two project, which also demonstrated this technology. Because this project uses the same technology as RSEP and because it was sited adjacent to artificial sources of water, it provides a good perspective from which to examine the potential effects of the RSEP in terms of bird collisions and incinerations. In addition, a bird mortality study was conducted for this project to assess the project's effects.

As part of the Solar One project, the United States Department of Energy and Southern California Edison sponsored a study to determine the bird mortality rate and causes of mortality at this experimental project (McCrary et al., 1986). This study involved six bird carcass surveys from May 3 to June 8, 1982, and 34 carcass surveys from September 16, 1982, through May 1983. The study found 70 bird fatalities involving 26 species of birds over a period of 40 weeks. The study determined that the causes of the fatalities included collisions with structures (mostly the mirrored heliostats), based on external examination of broken mandibles and bones, and burning in the heliostat standby points or target points, based on singed or burned feathers observed on the carcasses. The standby points are the focal points in the air adjacent to the solar concentrator tower target on which groups of heliostats may be focused when they are not stowed and when the power plant is on standby mode and not generating electricity. If several heliostats are focused on three or four points in the air, they can cause very high temperatures to occur within a relatively restricted zone near the top of the solar concentrator tower. Birds may fly into this zone and be unable to escape before being burned.

One feature of the Solar One site is that it was built near irrigated agricultural fields and an 80-acre constructed water impoundment. The study notes that creosote bush scrub is a habitat that is "usually only sparsely inhabited by birds." Nineteen of the 57 (33 percent) birds (9 species) that were killed by collision were birds that are associated with water, however, and would not be likely to be at the site if the water feature were not there. In addition, other birds may have been attracted to the site by the large water features and the increased potential food resources (e.g., invertebrate blooms from the water impoundment and irrigated fields).

In comparison, the RSEP will not be located next to irrigated fields and the large artificial ponds (approximately 80 acres) at Solar One. RSEP will have up to 15 acres of evaporation ponds that will contain water most of the year, although the ponds may dry out occasionally during times of intense heat in the summer. Although it is possible that RSEP's ponds could attract migrating birds that would otherwise not be resident in this area, it is

likely that this effect would be much less than what occurred in the vicinity of Solar One, which is a western Mojave Desert location along the Mojave River corridor and adjacent to an area of groundwater pumping for irrigated agriculture.

Based on engineering calculations, it is possible that the heliostat mirrors will generate enough heat to harm or kill birds where the reflected solar energy of three or more heliostats combines on an area 1 foot square. This will occur at RSEP within a radius 817 feet outward and downward from the solar collector points at the top of the solar tower. If birds fly into this zone and cannot orient themselves to heat variations sufficiently to fly away from this zone, they may be injured or killed.

Existing Design Mitigating Measures

Avian species identified during surveys conducted for RSEP are migratory resident birds that could be at risk of collision with the solar collector tower, and migratory bird collision deaths are most often associated with facilities ranging from 500 to 650 feet high (Maehr et al., 1983), which is in the range of the solar collector tower (maximum height 653 feet). The tower, however, would be visible during the daytime and, per FAA regulations, would be fitted with lights that may deter or warn birds at night.

This Plan includes measures to monitor the extent of bird collisions with the solar collector tower and heliostats, and also determine the extent of bird incineration. In the event that RSE determines a significant impact to avian species, RSE will work collaboratively with resources agencies and avian specialists to identify adaptive mitigating measures to deter birds from the project site. These measures may include any combination of audio or visual bird scare devices (for examples: http://www.birdbusters.com/bird_scare_campaign.html) to deter birds from entering the heliostat arrays, or engineered controls such as modifying the evaporation ponds in a manner that allows faster evaporation.

Study Methodology

There is some uncertainty regarding the extent to which birds flying in the vicinity of the RSEP might be attracted to the heliostat field (believing it to be a body of water) or to the evaporation ponds. For this reason, fatality/carcass studies are being proposed in this Plan to estimate the annual number of avian fatalities caused by RSEP. Standardized fatality monitoring will begin once RSEP is operational. The study should be conducted for a minimum of one year, with a less intensive monitoring program (incidental monitoring) in place for the life of the project. The study, derived from the CEC's *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Projects* (California Energy Commission and California Department of Fish and Game, 2007), includes the following components:

1. Standardized carcass searches
2. Searcher efficiency trials
3. Carcass removal trials
4. An incidental casualty and injured bird reporting system

Scheduling/Timing

Standardized carcass searches will be conducted approximately four times during Year 1 at the RSEP site as follows: one during the summer nesting period (February 1 to August 31)

and the other three during the winter migratory period (November 1 to January 31). An initial clearance search will be conducted within 30 days after the date the new facility is operational (commercially producing electricity)—expected third quarter 2013—to clear the site of evidence of old carcasses and document fatalities that may have occurred during the testing and early operational phase of the new facility.

Standardized Carcass Searches

Personnel trained by the RSEP Environmental Compliance Manager (ECM) in proper search techniques will conduct the carcass searches. Initially, transects will be set no more than approximately 20 feet apart throughout the project site. A searcher(s) will walk while surveying both sides of the transect accomplishing 100 percent visual coverage for casualties. Search area and speed may be adjusted after evaluation of the first searcher efficiency trial.

The condition of each carcass found will be recorded using the following categories (Anderson et al., 1999):

- Intact: a completely intact carcass, which is not badly decomposed, and shows no signs of predation or scavenging.
- Scavenged: a whole carcass, showing signs predation or scavenging, or a partial carcass in one location (e.g., body parts and pieces of skin).
- Feather spot: 10 or more feathers or 2 or more primaries at one location suggesting predation or scavenging.

Appendix A contains example field forms for the carcass searches and fatalities discovered. All carcasses found will be labeled with a unique number, bagged, and frozen for future reference and possible necropsy. A copy of the field data sheet for each carcass will be kept with the carcass at all times. Data recorded on the field forms will include species, sex, and age when possible, date and time collected, global positioning system (GPS) location, condition (e.g., intact, scavenged, feather spot), and any additional notes that may indicate cause of death. All casualties located will be photographed in situ and shown on a detailed map of the study area in relation to a numbered heliostat or other distinguishing facility landmark.

Carcasses found by operations personnel and others not conducting the formal searches within the RSEP site will be documented using the Casualty Information Form (Appendix A). Collection of state or federal endangered, threatened, or protected species will be coordinated with the USFWS and CDFG. When non-study personnel discover carcasses or injured animals, a photograph will be taken, and a qualified person designated by the ECM will be notified to identify the casualty. To help identify raptor carcasses to species, searchers can use the Energy Commission's *2005 Guide to Raptor Remains:* A *Photographic Guide for Identifying the* 76 *Remains of Selected Species of California Raptors* www.energy.ca.gov/2005publications/CEC-500-2005-001/CEC-500-2005-001.PDF.

Personnel potentially involved in searches will receive training prior to working on the project. Fatalities found within search areas, but not during scheduled searches, will be included in the fatality estimation.

Any injured native birds found will be carefully captured by a trained technician and transported to a designated wildlife rehabilitation center or veterinary clinic in a timely manner. An example protocol for handling injured birds is found in Appendix B and should be used for this project. Appropriate collection permits will be obtained from the USFWS and/or CDFG.

Searcher Bias Trials

Searcher bias trials will be conducted in the same areas that standardized carcass searches occur. Searcher bias will be estimated by size of carcass, general habitat type, and season. Estimates of searcher bias will be used to adjust the number of carcasses found, correcting for the bias. A searcher bias should be determined for each individual searcher on the search team.

Searcher bias trials will begin when RSEP is operational. Personnel conducting the searches will be unaware when bias trials are conducted or the location of the trial carcasses. During each standardized carcass search, approximately 10 trial carcasses of birds of two different size classes will be placed in the study area. Species such as house sparrow (*Passer domesticus*) and European starling (*Sturnus vulgaris*) will be used to represent small-sized birds. Species such as rock dove (*Columba livia*), mallard (*Anas platyrhynchos*), and pheasant (*Phasianus colchicus*) will be used to represent medium- to large-sized birds. The bias trials will take place during each survey event.

Bias carcasses will be randomly placed within the study area prior to the fatality/casualty search on the same day. Each bias bird will be discreetly marked so that it can be identified as a study carcass after it is found. The number and location of the study carcass found during the fatality/casualty search will be recorded.

Carcass Removal Trials

Carcass removal trials will be conducted during the first monitoring year during all seasons. Estimates of carcass removal will be used to adjust carcass counts for removal bias. Carcass removal includes removal by predation or scavenging, or inadvertent removal by RSEP staff during routine maintenance and operation procedures.

Carcass removal trials will occur during the winter, spring, summer, and fall to incorporate effects of varying weather conditions and scavenger densities. Planted bird carcasses will be located within the study area. To alleviate any confusion that the planted carcasses are RSEP-related fatalities, a wood stake marked with compass bearing and distance from carcass will be installed nearby to identify the bird as part of the trial. The planted carcasses will be located randomly within project site.

Each season, approximately 10 bird carcasses of two size classes will be distributed throughout the study area. Species such as house sparrow and European starling will be used to represent small-sized birds. Species such as rock dove, mallard, and pheasant will be used to represent medium- to large-sized birds. Approximately 4 to 6 trial carcasses from each size class (10 total carcasses) will be placed in the study area during each seasonal trial. Carcass checks to determine removal rates will occur every day for the first 4 days, and then on day 7, day 10, day 14, and day 20. Any remaining trial carcasses will be removed at the end of the 20-day period.

Statistical Analysis Methods for Fatality Data

The estimate of the total number of RSEP-related fatalities will be based on three components: (1) observed number of carcasses, (2) searcher bias expressed as the proportion of planted carcasses found by searchers, and (3) removal rates expressed as the length of time a carcass is expected to remain in the study area and be available for detection by the searchers.

Estimation of the Total Number of Facility-Related Fatalities

An estimate of the total avian fatalities (ETF) will be calculated using the field search results and the calculated bias estimates. The ETF combines the total dead birds and feather spots found and the calculated searcher and removal biases. An ETF will be calculated for each surveyor by search event. The ETF formula is:

$$ETF = TDBF + SB + RB$$

Example: if 8 birds are found and determined to have collided with the heliostats during the search, the searcher bias is 2, and the removal bias is 2, then:

$$ETF = 8 + 2 + 2 = 12$$

Therefore, in this example, 12 birds are estimated to have been killed from facility-related collisions.

Estimation of Searcher Efficiency

The proportion of "planted" birds that were not found by the searcher will determine searcher Bias. The formula for the calculations is as follows:

$$SB = (TDBF/PBF) - TDBF$$

Where SB = searcher bias; TDBF = total dead birds and feather spots found in the search area; and PBF = proportion of planted birds found during the bias study.

Example: if 8 dead birds are found, including 4 out of 5 of the planted birds:

$$SB = (8/(4/5)) - 8 = 2$$

Therefore, in this example, this particular searcher will not find 2 birds.

Estimation of Carcass Removal

Carcass removal bias is the proportion of missing birds for which no trace remains after the 20-day trial. Feather spots will be counted as bird sign and included in the bias. The formula to determine removal bias is:

$$RB = (TDBF + SB)/PNR - (TDBF + SB)$$

Where RB = removal bias; PNR = proportion of "planted birds" not removed by scavenger; TDBF = total dead birds found; and SB = search bias.

Example: if 8 birds are found and 4 out of 5 planted carcasses are not removed by scavengers:

RB = (8+2)/(4/5) – (8+2) = 2.5 birds are expected to be removed by scavengers.

Reporting and Remedial Actions

RSE will provide progress reports to the agencies periodically—likely to follow each standardized carcass search—that will include data pertaining to avian fatalities discovered to date. The USFWS and CDFG will also be contacted within 24 hours of any observation of a federal or state protected species fatality attributable to RSEP for the life of the project. An annual report summarizing all standardized surveys will be prepared at the end of year 1 of this study, which will be provided to the resources agencies. If requested by the resource agencies, additional reporting summarizing long-term incidental monitoring over the life of the project will be provided. At a minimum, incidental data collected will be kept on file with the ECM and provided upon request.

This monitoring program will provide data for evaluating the direct impacts of the Project on birds and bats from mortality studies. Concerned stakeholders in this program, including RSE, CEC, USFWS, CDFG, and any consultants assisting in the implementation of this Plan, should review the monitoring results and make recommendations regarding additional monitoring or mitigation measures (if determined necessary). Remedial actions may include:

- Adding bird deterrents within the heliostat field
- Implementing additional studies to determine the cause of excess avian casualties
- Providing offsite compensation of breeding habitats
- Initiating formal consultation with USFWS and/or CDFG

Evaporation Pond Bird Monitoring and Mitigation Plan

Evaporation Pond Design

The proposed project would include three evaporation ponds, 5 acres each, to be located at the southern end of the heliostat field. As outlined in the Report of Waste Discharge (ROWD) (RSE, 2009), the evaporation ponds have a proposed average design depth of 6 feet across each pond, which incorporates:

- 1 foot of sludge accumulation
- 3 feet of operational depth (water level)
- 2 feet of freeboard

There are no perennial water sources within Rice Valley where RSEP is located. This area has not traditionally been a stopping point for migratory birds. Waterfowl and other birds may be attracted to the evaporation ponds; however, this will be limited by the absence of riparian vegetation. The ponds will be double lined to prevent leakage. The surrounding area is and will continue to be desert vegetation. Brush will be cleared for a distance of at least 30 feet from the ponds to reduce habitat for birds and hiding places for predators that could prey on birds attracted to the ponds.

The use of anti-perching devices around the perimeter of each pond would assist in excluding ravens and other birds from accessing the edge of the ponds to drink the water. Additionally, operational design of the ponds is such that a minimum freeboard of 2 feet would be maintained at all times, and the interior slopes of the ponds would be at 33 percent (3:1, horizontal: vertical). These project design features would make it difficult for perching birds and/or shorebirds to access the water, and are anticipated to minimize risk to wildlife by minimizing availability of water as a new subsidy.

The ponds will remain uncovered to maximize evaporation and to avoid trapping birds under netting or monofilament arrays. It is anticipated that primarily waterfowl such as ducks and geese would be able to access the evaporation ponds by landing on the water. Waterfowl are anticipated to be the highest risk category; the management response below (see Post-construction Bird Monitoring Program) focuses on both waterfowl and shorebirds.

A concern to water birds is the formation and accumulation of salt crystals from hyper-saline conditions on the feathers of waterfowl, which impedes their ability to fly by weighing down the affected bird and potentially resulting in salt toxicosis (poisoning) (Woebser and Howard, 1987; Gordus et al., 2002). Evidence suggests that salinity levels are not the sole determining factor in the potential for salt encrustation on waterfowl. Studies have shown that the formation of salt crystals on hyper-saline ponds is typically associated with water temperatures at or below 4 degrees Celsius (39 degrees Fahrenheit) (Woebser and Howard, 1987; Gordus et al., 2002). It is not anticipated that water temperatures will

consistently drop to this level of concern; however, salt encrustation could occur above this temperature range.

Salt toxicosis via salt ingestion may also occur from overexposure to hypersaline waters when alternative freshwater sources are unavailable or limited (during drought conditions or long-distance migrations) and birds become dependent on a hypersaline water supply (Gordus et al., 2002). Based on the biological monitoring associated with the evaporation ponds at the Harper Lake Solar Electric Generating Station, an established facility with similar solar energy process, salt encrustation and salt toxicosis have been a rare occurrence.

Post-construction Bird Monitoring Program

This monitoring and mitigation approach has been selected to manage potential adverse effects on birds. The monitoring program will include assessing bird populations at the ponds and measuring the water quality. Monitoring will determine birds' level of attraction to the evaporation ponds and, if needed, adaptive measures that can be taken to deter birds from approaching the ponds.

Bird Monitoring

Avian monitoring at the evaporation ponds would be conducted by the Project ECM (or qualified onsite personnel approved by the ECM) at least twice monthly for the first 2 years of project operation and thereafter, if directed by Rice Solar Energy LLC or the appropriate regulatory agency. Monitoring will take place at various times of day (dawn, midday, dusk). Time of day and weather conditions during each monitoring event will be recorded on a datasheet, along with bird observations. The monitor would identify bird species and/or functional groups (e.g., waterfowl, waders, shorebirds, upland shorebirds) utilizing the ponds, record the behavior of the birds (e.g., drinking, feeding, swimming, wading, nesting), and note any mortalities or physical infirmities (e.g., birth defects or reduced growth) associated with any bird observed on or adjacent to the evaporation ponds. The monitor will conduct inspections of the ponds and perimeters and collect any carcasses and record when and where they were found and mark the locations on a site map. Any dead bird that can be safely retrieved from the evaporation ponds would be collected by the monitor and sent to a qualified laboratory to determine if the mortality was directly related to salt toxicosis or encrustation. Documented mortality resulting from salt toxicosis or encrustation would result in corrective measures implemented in coordination with the agencies.

Water Quality Monitoring

Each actively used evaporation pond will be outfitted with a level gauge for daily water level measurements, a hydrometer for daily salinity measurements, and a direct reading thermometer with the temperature data recorded at least diurnally. If the average overnight water temperature in the active evaporation ponds is at or below 4 degrees Celsius, the ECM will conduct a visual survey of the ponds immediately upon arrival the following morning. If upon inspection of the active ponds, the ECM observes evidence of recent substantive increases in salt crystallization anywhere within the pond (e.g., at or near the waterline), or if water levels in any of the ponds are observed to be low and causing

elevated levels of total dissolved solids (TDS), the ECM will route all of the wastewater into one or two ponds to increase the pond volume and lower the average salinity within the pond(s). At the same time, the remaining pond or ponds will be pumped dry. The pond to which the combined flow is discharged during this time will be rotated each year, or periodically as needed, so that water levels do not rise too high and minimum freeboard requirements are met.

In accordance with Title 27 CCR 21720(f), all discharges into the evaporation ponds will be recorded in the Operating Record. The following items will be recorded:

- Volume in million gallons per day (mgd)
- Cumulative total of wastewater flow, in million gallons, per month
- The maximum daily flow rate, in mgd, each month

Discharge to the evaporation ponds will be managed as needed to discourage wading birds from using the evaporation ponds.

The evaporation ponds will be sampled at the commencement of operation and semiannually thereafter to document constituent concentrations. Samples will be analyzed by a laboratory approved by the California Department of Public Health. A list of parameters and frequency of their sampling is presented on Table 4. Annual grab samples of wastewater from each pond will be collected in the last quarter of each year. Semiannual samples will be collected from each pond and composited into one sample by the approved laboratory.

Annually, in the last quarter of each year, two representative grab samples of the bottom evaporative residue in each pond, if present, will be collected, composited, and analyzed for the parameters show on Table 4.

Quarterly water quality testing of TDS, temperature, salinity, and pond water levels will be conducted for each pond in conjunction with qualitative behavioral and avian health monitoring. The monitor will record test results on a datasheet. Should bird mortality occur, an additional water grab sample will be collected from the ponds at the time of discovery for analysis.

Reporting and Record Keeping

Monitoring Plan results will be retained at the Facility as part of the Operating Record.

At the conclusion of every operational year, the ECM will prepare a report summarizing the results of the various tests and monitoring efforts described in this plan for submittal to the CEC Compliance Project Manager (CPM). The summary report will include copies of the water quality tests, a chronological listing of the overnight water temperatures, water levels and salinity measurements for the active evaporation ponds, and any results of necropsies performed on birds salvaged from in or around the ponds.

Thresholds for Implementation of Adaptive Measures

Monitoring data collected on bird use of the evaporation ponds will be used to determine the need for implementation of adaptive measures. A baseline of bird use will be established

during the first year of operation. If there is an increasing trend of bird use over the first 2 years of operation, continued monitoring may be warranted.

Documented mortality resulting from salt toxicosis or encrustation would trigger the need for corrective measures to be implemented in coordination with the agencies.

TABLE 4
Evaporation Pond Monitoring - Water Quality Sampling Schedule

Parameter	Unit	Sampling Schedule
Evaporation Pond Wastewater Sampling Parameters		
Ammonia	As N	Startup and annual
Aluminum	mg/L	Startup and annual
Arsenic	mg/L	Startup and annual
Boron	mg/L	Startup and annual
Calcium	mg/L	Startup and annual
Chloride	mg/L	Startup, annual, semiannual
Cyanide	mg/L	Startup and annual
Fluoride	mg/L	Startup and annual
Iron	mg/L	Startup and annual
Magnesium	mg/L	Startup and annual
Molybdenum	mg/L	Startup and annual
Nitrate as nitrogen	mg/L	Startup and annual
Nitrite as nitrogen	mg/L	Startup and annual
Phosphate	mg/L	Startup and annual
Potassium	mg/L	Startup and annual
Selenium	mg/L	Startup, annual, semiannual
Silica	mg/L	Startup and annual
Silicon	mg/L	Startup and annual
Sodium	mg/L	Startup and annual
Strontium	mg/L	Startup and annual
Sulfate	mg/L	Startup, annual, semiannual
TDS	mg/L	Startup, annual, semiannual, quarterly
Total alkalinity	mg/L as $CaCO_3$	Startup and annual
Zinc	mg/L	Startup and annual
pH	pH	Startup, annual, semiannual
Temperature	Fahrenheit or Celsius	semiannual, quarterly
Salinity		Quarterly
Evaporation Pond Residue Sampling Parameters		
Antimony (total)	mg/kg	Annual
Arsenic (total)	mg/kg	Annual
Barium (total)	mg/kg	Annual
Beryllium (total)	mg/kg	Annual
Cadmium (total)	mg/kg	Annual
Chromium (total)	mg/kg	Annual
Cobalt (total)	mg/kg	Annual
Copper (total)	mg/kg	Annual

TABLE 4
Evaporation Pond Monitoring - Water Quality Sampling Schedule

Parameter	Unit	Sampling Schedule
Lead (total)	mg/kg	Annual
Mercury (total)	mg/kg	Annual
Molybdenum (total)	mg/kg	Annual
Nickel (total)	mg/kg	Annual
Selenium (total)	mg/kg	Annual
Silver (total)	mg/kg	Annual
Thallium (total)	mg/kg	Annual
Vanadium (total)	mg/kg	Annual
Zinc (total)	mg/kg	Annual
Biphenyl, diphenyl oxide	mg/kg	Annual

Note: Semiannual samples to be a composite sample of all three ponds; annual samples will be grab samples.

Water quality data collected from the evaporation ponds during quarterly, semiannual, and annual sampling will be compared to toxicity benchmarks approved by the agencies. The proposed toxicity benchmarks for evaporation pond water quality are presented on Table 5.

Because water quality is difficult to tie directly to ecological risk by implementation of numeric standards, TDS concentrations will not trigger remedial action; however, the data will be collected to assess potential long-term correlations between water quality, as well as the pond water level, pond salinity, and temperature data, and bird behaviors and mortality, if any.

Potential Impact Reduction and Mitigation Measures

If attraction of birds to the evaporation ponds becomes a problem or if bird mortality was determined to be the result of salt toxicosis or encrustation, the mitigation measures described below or additional measures as determined through consultation with the appropriate agencies may be implemented.

Measures that would be taken, as necessary, to keep birds from using the ponds include:

- In the event that climatic conditions are such that evaporation must be increased to maintain pond levels below the freeboard limits, evaporative disposal nozzles (for example, see http://www.bete.com/applications/disposal.html) will be used to increase wastewater evaporation rates.
- Initiate use of air cannon in order to haze waterfowl and frighten them away from the evaporation ponds. The air cannon would be stored on site, but used only under this circumstance, since birds may become acclimated to the disturbance caused by air cannon hazing if used regularly. The air cannon would be used until the evaporation process was completed in the pond, or until the crystallized salts returned to solution.
- Deploy "Bird-B-Gone Balloon" (a visual scare device) or other hazing devices into the pond to discourage waterfowl from landing on the pond.

- If the above mitigation measures prove inadequate, the pond may be covered with netting or monofilament arrays to prevent birds from accessing the water. This alternative is not preferable, because it requires frequent monitoring and repair and, if birds do obtain access beneath the netting, they could become trapped and unable to escape.

TABLE 5
Proposed Toxicological Benchmarks for Bird Exposure to Evaporation Ponds at RSEP

Parameter	Predicted Chemistry of Combined Discharge to Evaporation Pond (mg/L)	Proposed Toxicological Benchmark (mg/L)	Source
Aluminum		411.6	LOAEL, Form: AlCl3, Test species: day-old white leghorn chicks, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Ammonia			
Antimony			
Arsenic		118.8	LOAEL, Form: sodium arsenite, Test species: mallard duck, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Arsenic		68.3	LOAEL, Form: paris green (copper acetoarsenite), Test species: mallard duck, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Barium	0.08	385.7	LOAEL, form: barium hydroxide, test species: 1-day old chicks, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Beryllium			
Boron		925	LOAEL, form: boric acid, test species: mallard duck, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Cadmium		185	LOAEL, form: cadmium chloride, test species: mallard duck, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Calcium	43.66		
Chloride	878.19		
Chromium	0.03	46.25	LOAEL, form: Cr+3 as $CrK(SO_4)_2$, test species: black duck, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Chromium	0.03	29	LD50, form: Cr+6 Test species: chicken, Receptor species: mallard (Eisler, 2000)
Cobalt			
Copper		570.7	LOAEL, form: copper oxide, test species: 1-day old chicks, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Cyanide		68	LD50, form: sodium cyanide, American Kestrel: chicken, Receptor species: mallard (Weimeyer et al., 1986)
Fluoride	2.2	296	LOAEL, form: NaF, test species: screech owl, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Iron	0.33		

TABLE 5
Proposed Toxicological Benchmarks for Bird Exposure to Evaporation Ponds at RSEP

Parameter	Predicted Chemistry of Combined Discharge to Evaporation Pond (mg/L)	Proposed Toxicological Benchmark (mg/L)	Source
Lead		104.53	LOAEL, form: lead acetate, test species: Japanese quail, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Magnesium	2.48		
Mercury		8.33	LOAEL, form: mercuric chloride, test species: Japanese quail, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Molybdenum	0.07	326.53	LOAEL, form: sodium molybdate (MoO_4), test species: chicken, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Nickel		989.75	LOAEL, form: nickel sulfate, test species: mallard duckling, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Nitrate	6.89		
Nitrite			
Orthophosphate	0.26		
Phosphate			
Phosphorous	0.31		
Potassium	6.64		
Reactive Silica	34.98		
Selenium		7.4	LOAEL, form: selanomethio-nine, test species: mallard duck, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Silica	40.85		
Silicon			
Silver			
Sodium	663.86		
Strontium			
Sulfate	357.46		
Thallium			
Vanadium	0.05	105.45	NOAEL, form: vanadyl sulfate, Test species: mallard duck, Endpoint species: Belted Kingfisher (Sample et al., 1996)
Zinc	0.08	1211.8	LOAEL, form: zinc sulfate, Test species: white leghorn hen, Endpoint species: Belted Kingfisher (Sample et al., 1996)

TABLE 5
Proposed Toxicological Benchmarks for Bird Exposure to Evaporation Ponds at RSEP

Parameter	Predicted Chemistry of Combined Discharge to Evaporation Pond (mg/L)	Proposed Toxicological Benchmark (mg/L)	Source
TDS	2,038		
Total alkalinity	176.69		
Total hardness	112.34		
Bicarbonate alkalinity	148.09		
Carbonate alkalinity	28.6		
Specific Conductance (µS/cm at 25°C)	4,174		
pH		<1.5	LD50, Test species: ducks, coots, grebes, Receptor species: mallard (Read, 1999)
Salinity		9000	Threshold Level, Test species: Mottled duck (Moorman et al., 1991)
Biphenyl, diphenyl oxide			

Notes:

LOAEL = Lowest-observed-adverse-effect-level

NOAEL = No observable adverse effect level

LD50 = Lethal Dose, 50% or median lethal dose

Selection criteria for toxicological benchmarks: The LOAEL was selected when available for the most sensitive water bird (typically the belted kingfisher). NOAEL or LD50 was used when no LOAEL was available

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Appendix A
Example Field and Laboratory Forms

Rice Solar Energy Project
Casualty Information Field Form

Date: _____ Time: _____ Observer Name: _____

Found During (check one): ___Scheduled Carcass Search ___ Incidental Find

Collected? (circle one): Yes No Sample Number:_____ Photo Number: _____

Site Location (check one): ___Heliostat Array ___Solar Collector Tower ___Other Location
Distance and Compass Bearing from Nearest Facility Landmark:
_____

Habitat Description: _____

Species: _____ Sex (circle one): M F U Age (circle one): A J U
Condition of Find (check one): __injured __intact __scavenged __partial __feather spot __other
Additional Comments:
_____

Estimated time since death/injury: _____

Weather History [If carcass is estimated to be less than one week old, circle any of the following weather conditions that occurred at or before the estimated time of death/injury]:

Clear Calm Fog Cloudy Rain Snow Storm Gusty Wind Violent Storm

Additional Weather Notes: _____

General Comments [for example: behavior observed if bird is injured, details of carcass (e.g., body part missing, apparent injuries, number of feathers in feather spot, indications of cause of death, field marks for identification of species, USFWS bird band number, etc.)]
_____
_____

Agency Contact(s)

USFWS Contact: Date: _____ Time: _____ Recovery Approval: ___Yes ___No

USFWS Contact Person Name: and Phone Number: _____

CDFG Contact: Date: _____ Time: _____ Recovery Approval: ___Yes ___No

CDFG Contact Person Name: and Phone Number: _____

Disposition of Find: _____

Transported to Freezer: _____ Date: _____ Time: _____

Release to USFWS/CDFG: Agency/Person Name: _____ Date: _____

Time: _____

Rice Solar Energy Project
Searcher Bias Trials: Carcass Placement Log

General Information: Season _____ Month _____ Other Info _____

No.	Species/Age	Placed By	Date	Time	Site Location	Found (y/n)	Retrieved (y/n)	Additional Notes
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Weather notes for days that carcasses are placed:

Date_____ Time _____ Temp. _____ Wind Dir _____ Wind Speed _____ Precip. _____

Date_____ Time _____ Temp. _____ Wind Dir _____ Wind Speed _____ Precip. _____

Date_____ Time _____ Temp. _____ Wind Dir _____ Wind Speed _____ Precip. _____

Date_____ Time _____ Temp. _____ Wind Dir _____ Wind Speed _____ Precip. _____

Appendix B
Example Protocol for Handling Injured Birds and other Wildlife

Injured Wildlife
Procedures for Reporting and Care

The following procedures apply to injured birds or other wildlife. Record data on the Casualty Information Form (Appendix A). However, the primary objective is to provide immediate care for the injured animal. Capture animal by placing a dark cloth or blanket over the animal. By removing its ability to see, generally it will calm down and be more easily handled. Place the animal in a box that has a towel or other material for the animal to hide under or grasp on to.

Quickly look around the immediate area for other injured animals as there may have been a flock, or a pair. While capturing the animal, assess the injury so you'll know what to report to the wildlife rehabilitator or veterinarian. Do not provide additional stress. Keep it cool if it is a hot day and keep it slightly warm if it is a cool day by placing the box indoors in a darkened room if possible.

If it is a federally listed (Threatened, Endangered) or California State listed (Threatened, Endangered) species, the ECM shall contact the appropriate agency.

- The contact information for CDFG Region 6 (Imperial, Inyo, Mono, Riverside, and San Bernardino Counties) is: 3602 Inland Empire Boulevard, Suite C220, Ontario, CA 91764 (telephone: (909) 484-0167; website: http://www.dfg.ca.gov/regions/6/).
- For federally listed species, the ECM should contact USFWS at: 2493 Portola Road, Suite B, Ventura, CA 93003 (telephone: (805) 644-1766; website: http://www.fws.gov/ventura/).

These calls should be made within 24 hours of discovery. Telephone the designated rehabilitation center (to be determined) for additional instructions. Describe the injury to the rehabilitation center and they will determine if it should go directly to a veterinary clinic.

Deliver the animal to the specified location as directed by the regulatory agencies or the clinic. The veterinarian should fill out the "Casualty Examination Form." The clinic will make arrangements to deliver the animal to the designated rehabilitation center. RSE will pay for all veterinary bills.

Attachment DR75-1
Draft Weed Management Plan

DRAFT

Weed Management Plan
for the
Rice Solar Energy Project

Riverside County, CA

Prepared by:

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April 2010

Weed Management Plan
for the
Rice Solar Energy Project

Riverside County, CA

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List of Abbreviated Terms

°F	Degrees Fahrenheit
ac	acre(s)
AFC	Application for Certification
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
BRMIMP	Biological Resources Mitigation Implementation and Monitoring Plan
Cal-IPC	California Invasive Plant Council
CDCA	California Desert Conservation Area
CDFA	California Department of Food and Agriculture
CPM	Compliance Project Manager
CSP	Concentrating solar power
DFG	California Department of Fish and Game
ECM	Environmental compliance manager
EPA	U.S. Environmental Protection Agency
FLPMA	Federal Land and Policy Management Act
GIS	Geographic information system
kV	Kilovolt
mph	Miles per hour
NECO	Northern and Eastern Colorado
NPPA	Native Plant Protection Act
OHV	Off-highway vehicle
PAR	Pesticide application record
PEIS	Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement
PPA	Plant Protection Act of 2000
PUP	Pesticide use proposal
RSEP	Rice Solar Energy Project
SR	State Route
U.S.C.	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior
WMA	Weed Management Area

Chapter 1. Introduction

1.1. Plan Purpose

Noxious weeds and invasive plants can negatively impact biological resources when left unmanaged. Implementation of this Plan will reduce noxious weeds and invasive plants at the Rice Solar Energy Project (RSEP) site. This Plan addresses plants of concern to the Bureau of Land Management (BLM), local weed management areas (WMAs), and the California Invasive Plant Council (Cal-IPC). For this Plan, noxious weeds are defined as non-native species that are included on lists maintained by the California Department of Food and Agriculture (CDFA 2010a and 2010b), the California Invasive Plant Council (Cal-IPC 2006), and weeds of special concern identified by BLM (pers. comm., Bartz 2010; pers. comm., Beckmann 2010).

This Plan provides: (1) an assessment of noxious weeds that currently occur or could potentially be introduced to the project area; (2) a description of measures to be used to survey for their presence during construction and operation; (3) monitoring and weed control methods to be employed during construction and operation; and (4) reporting requirements. Survey methods, monitoring frequency, target weeds species, and control methods described in this Plan are consistent with the BLM's policy and procedure. Procedures described in this Plan will assist in the early detection of and rapid response for weed species not addressed in this document.

1.2. Project Location

The RSEP project area consists of a privately-owned parcel and a 10-mile-long transmission line located primarily on BLM land. The site is located in eastern Riverside County south of State Route (SR) 62, approximately 1.6 miles east of the junction of SR 62 and Blythe Rice Road. The Arizona-California Railroad and the Colorado River Aqueduct occur north of SR 62 north of the RSEP site. The nearest occupied residence is approximately 15 miles northeast at the community of Vidal Junction, California. The Project is on private property surrounded by open desert that is managed by the U.S. Bureau of Land Management (BLM). The nearest town is Parker, Arizona, approximately 32 miles east of the RSEP site.

The RSEP is located within a larger, privately-owned holding that is 3,324 acres (the ownership property). Within this larger property, the RSEP is sited within a new square-shaped parcel (the project parcel) that will be created by merging what are currently four different assessor's

parcels, each of them a discrete section (square mile) of land, resulting in a single 2,560-acre parcel. Within this project parcel will be the administration buildings area, heliostat field with power block, and evaporation pond areas, (collectively, the project site or facility site) totaling 1,410 acres, that will be surrounded by a security fence. Areas outside the facility site but within the project parcel will not be fenced, developed, or disturbed as part of the RSEP. The RSEP includes a transmission line that travels from the project parcel 10 miles to the southeast and a new substation at the transmission line terminus. Figure 1 is a Project location map. Figure 2 is a Project Design Map.

1.3. Project Description

The RSEP will be a solar generating facility using concentrating solar power (CSP) technology, with a central receiver tower and an integrated thermal storage system. The RSEP's technology generates power from sunlight by focusing energy from a field of sun-tracking mirrors called heliostats onto a central receiver. Ground disturbing activities at RSEP will occur in three general locations: a main facility or plant site just south of SR 62, an approximately 10-mile transmission line connecting the facility site to the existing power grid, and a new substation located at the southeast terminus of the transmission line.

Facility Site. During construction of the facility site, all logistics, laydown, and parking will be contained within a fenced 1,504-acre project construction footprint at the facility site. During operation, the facility site will be confined to a fenced 1,410-acre area. The permanent 1,410-acre facility site will include parking areas, administration and maintenance buildings, a water treatment system, a 230-kV switchyard, two water wells, two leach fields, a 30-acre-foot detention basin, three evaporation ponds, and the approximately 1,370-acre heliostat field. Water will be supplied by two on-site groundwater wells and the project will not require tie-in with natural gas or any other pipelines. Temporary power for construction will be partly supplied by extending an existing distribution line from SR 62 to the RSEP administration building for a distance of approximately 1 mile.

The Project will utilize stormwater drainage features to channelize off-site stormwater flows from upstream of the project site, diverting off-site stormwater around the project site, and rejoining the natural flow channels to the south of the property. A perimeter access road around the heliostat field will act as a small berm and will be surrounded by an unlined ditch to direct stormwater around the solar site. A dirt, gravel, or paved road will be located on the raised berm on the inside of the ditch and the fenced perimeter. This road will be graded as needed for maintenance. On-site run-off will be directed toward an on-site, approximately 30-acre-foot detention basin.

Site preparation is expected to begin in the first quarter of 2011 with clearing and grubbing of the power block area. Other areas within the 1,410-acre heliostat field will be cleared only as needed to install the heliostats or provide permanent access to them for mirror washing. Therefore, some level of grading within the heliostat field is expected to continue for the length of time that it takes to install the 17,500 heliostats. RSEP is designed for an operating life of 30 years.

Transmission Line. An approximately 10-mile, 230-kV electrical generator tie-line extending from the southeast corner of the solar site across Rice Valley to the existing Western Blythe-Parker 161 kV/230 kV transmission line near the base of the Riverside Mountains is proposed. Approximately 7.5 miles of the new generator tie-line would be located on BLM Land. Construction of the first 4.6 miles of the tie-line originating from the solar site would require the construction of a 12-foot-wide dirt service road. The remaining 5.4 miles of the line will follow an existing dirt road (Rice Valley Road) to the interconnection substation. It is unlikely that the existing dirt road would need to be widened or improved for use. Approximately 90 poles supporting the transmission line are planned. The majority of the equipment staging for the pole installation would be from the dirt road.

Substation. At the transmission line terminus, 10 miles to the southeast of the facility site, a new 300 x 400 foot electrical substation will be constructed. The interconnection substation will be surrounded by a chain link security fence with attached tortoise exclusion fencing.

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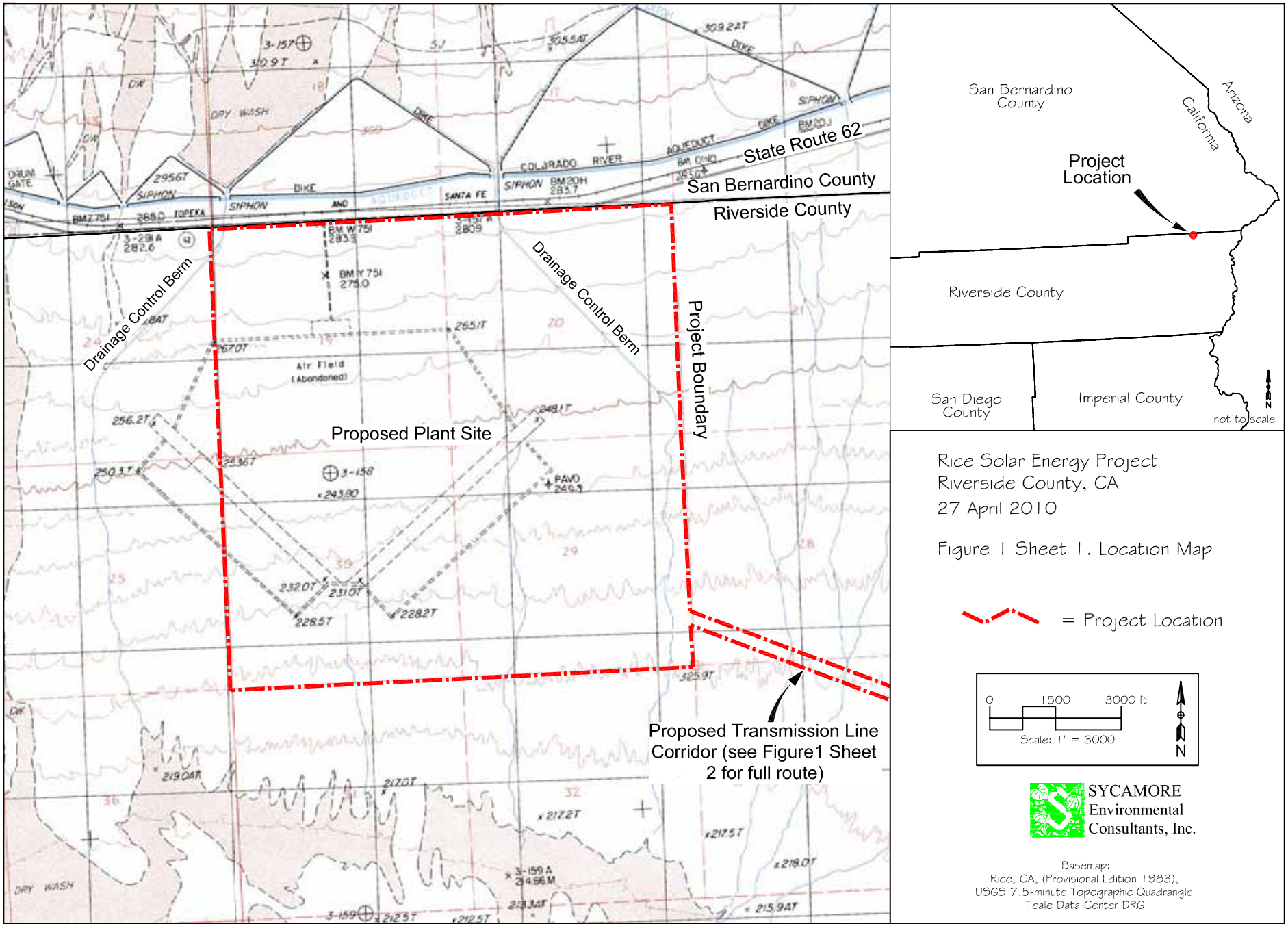

08099_RiceSolar-SPG-Figure1-v12.dwg

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Proposed Plant Site

Project Boundary

Rice Valley Road (Dirt)

Proposed Transmission Line Corridor (see Figure1 Sheet 1 for main site)

Rice Valley Road (Dirt)

Parker - Blythe 230kV WAPA / Midland - Vidal Road (Dirt)

R I C E

V A L L E Y

V A L L E Y

SAND DUNES

SAND DUNES

Rice Solar Energy Project
Riverside County, CA
27 April 2010

Figure 1 Sheet 2. Location Map

= Project Location

0 1500 3000 ft
Scale: 1" = 3000'

SYCAMORE Environmental Consultants, Inc.

Basemap:
Rice and Styx, CA, (Provisional Edition 1983),
Big mama Mts. NW & Grommet, CA (1971)
USGS 7.5-minute Topographic Quadrangles
Teale Data Center DRG

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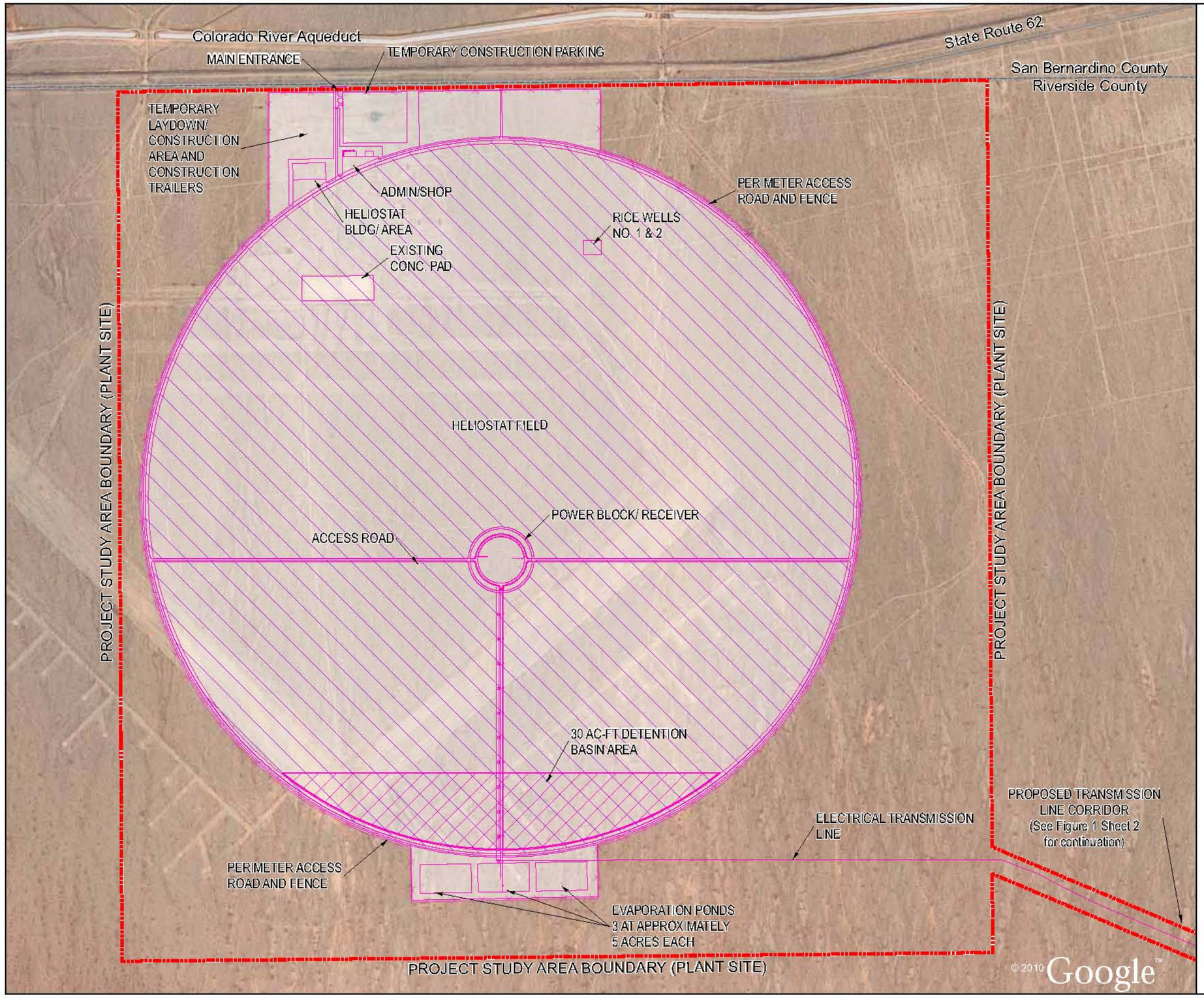
Rice Solar Energy Project
Riverside County, CA
27 April 2010

Figure 2. Project Design Map



Project Study Area Boundary
Heliostat Field
Detention Basin
Proposed Project Footprint/ Fence

1,200 600 0 1,200 Feet
N
Scale: 1 inch = 1,200 feet

SYCAMORE Environmental Consultants, Inc.

Proposed Project (magenta)
Conceptual General Arrangement
and Overall Site Plan (6 Oct. 2009)
by WorleyParsons resources & energy
SRRC-0-SK-112-111-001.dwg

Aerial Photograph: 5 April 2005
Image © 2010 DigitalGlobe
Google Earth Pro

08099RiceJD MainSite ProjectMap.mxd

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1.4. Noxious Weed Definition

The term ‘‘noxious weed’’ is defined in the federal Plant Protection Act (7 U.S. Code [U.S.C.] 7701 et seq.) as any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products); livestock, poultry, or other interests of agriculture; irrigation; navigation; the natural resources of the U.S.; the public health; or the environment. Noxious weeds are typically non-native plants that can rapidly colonize disturbed areas, including construction sites, roadsides, irrigated sites, or any other area with altered hydrology, soil structure, or soil chemistry.

1.5. Objectives

Weed management objectives for RSEP include the following:

- **Eradication**: This control objective is to eliminate all individuals of a particular species within a specified area. This will be the goal for most weed species at RSEP, and is appropriate where the weed species is of considerable economic and environmental concern and the population size is manageable.
- **Suppression**: This objective is aimed at reducing current infestation density, but not necessarily directed at reducing the total area or boundary of the infestation. This applies to many widely distributed, high-density weeds where eradication is not feasible.
- **Containment**: This objective is aimed at preventing infestation expansion and spread, and may be conducted with or without any attempt to reduce infestation density. Containment focuses on halting spread until suppression or eradication can be implemented, and is practical only to the extent that the spread of seeds or vegetative propagules can be prevented.

1.6. Management Roles

RSEP is ultimately responsible for implementing this plan. It is anticipated that RSEP contractors and other designees responsible for implementing components of this plan will include the following:

- **Contractor(s):** Language will be included in all construction documents and ongoing maintenance contracts to ensure that all contractors, subcontractors, vendors, maintenance personnel and other parties performing either construction or ongoing maintenance or repairs at the project site, abide by and implement (as necessary) the provisions of this plan. Implementing the construction provisions of this plan will be a part of construction contracts. Restoration contractors, landscape contractors, and other

specialists will implement specific provisions of this plan either as subcontractors to the general construction contractor, or through independent contracts with RSEP.

- **Construction Manager:** The construction manager will have ultimate oversight of the construction contractor to ensure compliance with the provisions of this plan.
- **Environmental Compliance Manager:** RSEP will retain an Environmental Compliance Manager (ECM) (including support staff as needed) to coordinate with the Construction Manager to ensure contractor compliance with environmental requirements for construction. The ECM will coordinate with the Facility Manager to ensure compliance with environmental requirements during the operational life of the project.
- **Bureau of Land Management:** A ± 7.5-mile stretch of the transmission line crosses land owned and managed by the Bureau of Land Management (BLM). This Plan is in general conformance with BLM standards for weed management on BLM lands.

Chapter 2. Applicable Laws, Ordinances, Regulations, and Standards

2.1. Federal Laws and Regulations

2.1.1. Federal Noxious Weed Act Of 1974

This act (7 U.S.C. §§ 2801-2814, January 3, 1975, as amended 1988 and 1994) provides for the control and management of non-indigenous weeds that injure, or have the potential to injure, the interests of agriculture and commerce, wildlife resources, or the public health. It gives the Secretary of Agriculture broad powers in regulating transactions in and movement of noxious weeds. The act states that no person may import or move any noxious weed identified by regulations of the Secretary of Agriculture into or through the U.S., except in compliance with the regulations, which may require that permits be obtained. The act also requires each federal agency to develop a management program to control undesirable plants on federal lands under the agency's jurisdiction, and establish and adequately fund the program. Some of the provisions of this act were repealed by the Plant Protection Act of 2000 (PPA), including U.S.C. 2802 through 2813. However, Section 1 (findings and policy) and Section 15 (requirements of federal land management agencies to develop management plans) were not repealed (7 U.S.C. 2801 note; 7 U.S.C. 2814).

2.1.2. Plant Protection Act of 2000

The PPA, as amended (7 U.S.C. 7701-7786) states that the detection, control, eradication, suppression, prevention, or retardation of the spread of plant pests or noxious weeds is necessary for the protection of the agriculture, environment, and economy of the U.S. This act defines the term ‘‘noxious weed’’ (7 U.S.C. 7702 § 403) to mean any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the U.S., the public health, or the environment. This act specifies that the Secretary of Agriculture may prohibit or restrict the importation, entry, exportation, or movement in interstate commerce of any noxious weed if it is determined “that the prohibition or restriction is necessary to prevent the introduction into the [U.S.] or the dissemination of a plant pest or noxious weed within the [U.S.],” and authorizes the issuance of implementing

regulations. Subsequent regulations implemented by the Noxious Weed Control and Eradication Act of 2004 amended the PPA.

2.1.3. Noxious Weed Control and Eradication Act of 2004

The Noxious Weed Control and Eradication Act of 2004 (P.L. 108-412) amended the PPA by adding a new subtitle, "Subtitle E--Noxious Weed Control and Eradication" (7 U.S.C. 7781-7786), which authorizes the Secretary of Agriculture to establish a program to provide financial and technical assistance to control or eradicate noxious weeds to public and private landowners. This act defines noxious weeds and removes references to statutes that were repealed upon enactment of the PPA. This act prohibits the movement of a federally designated noxious weed into or through the U.S. unless a permit is obtained for such movement and the movement is consistent with the specific conditions contained in the permit. This act specifies that such movement, under conditions specified in the permit, may not involve a danger of dissemination of the noxious weed in the U.S.; otherwise such a permit will not be issued. Under this act, grants are available to weed management entities for the control or eradication of noxious weeds, and agreements may be made with weed management entities to provide financial and technical assistance for the control or eradication of noxious weeds.

2.2. State and Local Laws and Regulations

2.2.1. California Food and Agricultural Code

Various portions of this code pertain to noxious weed management. Specifically, Food and Agricultural Code Section 403 states that the Department of Food and Agriculture should prevent the introduction and spread of injurious insect or animal pests, plant diseases, and noxious weeds. Under Sections 7270 through 7224, the California Commissioner of Agriculture is granted the authority to investigate and control noxious weeds, and specifically to provide funding, research, and assistance to weed management entities, including eligible weed management areas or county agricultural commissioners, for the control and abatement of noxious weeds according to an approved integrated weed management plan.

California Food and Agriculture Code Section 5101 and 5205 provides for the certification of weed-free forage, hay, straw, and mulch. This portion of the code recognizes that many noxious weeds are spread through hay, straw, and mulch, used for both forage and ground cover. The code allows for in-field inspection and certification of crops to ensure that live roots, rhizomes, stolons, seeds, or other propagules of noxious weeds are not present in the crop to be harvested. Certified weed-free forage, hay, straw, and mulch are required on BLM land,

and any mulch or hay bale materials used for erosion control at RSEP will be required to meet this certification.

2.2.2. Riverside County General Plan

The Land Use and Multipurpose Open Space Elements of the County General Plan (County of Riverside 2003) contains specific policies to preserve the character and function of open space that benefits biological resources. It also contains specific policies and goals for protecting areas of sensitive plant, soils and wildlife habitat and for assuring compatibility between natural areas and development. The RSEP area and most of eastern Riverside County is designated as Open Space Conservation in the general plan. Although the RSEP is not within one of the 19 area plans contained within the general plan it is addressed in the Eastern Riverside County Desert Areas (Non-Area Plan).

2.3. Standards

This section discusses the conservation and management plans relevant to surface management and noxious weed control at the RSEP site.

2.3.1. Conservation and Management Plans

Bureau of Land Management

To address the use of chemical treatments in noxious weed control, BLM prepared the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS; USDI 2007). The PEIS identifies the active herbicidal ingredients approved for use on BLM land, and the herbicidal ingredients that are no longer approved for use. The Record of Decision for the PEIS defers to approved land use plans the determination of areas to be treated through BLM's integrated pest management program, and makes no land use or resource allocations in this regard.

Appendix B, Herbicide Treatment Standard Operating Procedures, of the PEIS (Appendix A of this plan), specifies management of noxious weeds and application of herbicides on BLM land. Table B-1, Prevention Measures, specifies avoidance measures to limit noxious weed infestation, and Table B-2, Standard Operating Procedures for Applying Herbicides, provides details on herbicide application. The procedures listed Tables B-1 and B-2 of the PEIS (Appendix A of this plan) are incorporated as requirements of this plan.

California Desert Conservation Area Plan

The California Desert Conservation Area (CDCA) comprises one of two national conservation areas established by Congress at the time of the passage of the Federal Land and Policy Management Act (FLPMA). The FLPMA outlines how BLM will manage public lands. Congress specifically provided guidance for the management of the CDCA and directed the development of the 1980 CDCA Plan (BLM 1980). The 1980 CDCA Plan provides no specifics about noxious weed management, but specifies management strategies for broad areas of the plan boundary.

Northern and Eastern Mojave Coordinated Management Plan

As an amendment to the CDCA Plan, BLM produced the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) Final Environmental Impact Statement (BLM 2002). The NECO includes the proposed management actions and alternatives for public lands in the NECO Planning Area. This area encompasses 5.5 million acres and is located in the southeast portion of the CDCA of southeast California, mostly in Sonoran Desert. The RSEP is located in the eastern portion of the NECO Planning Area. The NECO plan goals include requirements for establishing standards for public land health and guidelines for grazing management in the NECO Planning Area; to identify management actions to conserve and recover threatened and endangered species; to make multiple use class decisions for lands released from wilderness consideration and make changes required to make the CDCA Plan conform to the California Desert Protection Act; to adopt an off-highway vehicle (OHV) strategy for motorized competitive speed events; and other measures. The NECO is relevant for noxious weed control within the plan boundaries. Specifically, it requires tougher standards for public land management, grazing, OHV, and other public land use activities that could influence noxious weed spread and establishment.

Chapter 3. Noxious Weed Assessment

3.1. Noxious Weed Species

Noxious weeds are defined for this document as species of non-native plants that are included on the weed lists of the California Department of Food and Agriculture (CDFA 2010a), the California Invasive Plant Council (Cal-IPC 2006), or those weeds of special concern identified by BLM (pers. comm., Bartz 2010; pers. comm., Beckmann 2010). The Nevada Department of Agriculture Noxious Weed List (NDA 2005), the Mojave Weed Management Area website (http://www.mojavewma.org/), and the Low Desert Weed Management Area map of weed occurrences and list of priority weeds were also consulted to assemble a list of noxious weeds to include in monitoring surveys. A list of invasive species that potentially could occur in the project site is provided in Table 1.

3.2. Landscape Context

Rice Valley is a hot, dry, low desert environment that is not conducive to the establishment of many noxious weed species. The Valley is a relatively small watershed that lacks perennial surface water and major washes (BLM 2007). The historic average annual precipitation at the nearby Blythe gauge is 3.52 inches per year (CDWR 2010). The former 3,770-acre Rice Valley Dunes Off-Highway Recreation Area (closed in 2002) is located south of the proposed site (BLM 2007). The historic use of Rice Valley by the military and more recently by recreational off road vehicles has likely exposed the Valley to many potential noxious weeds.

3.3. Field Surveys

Noxious weeds were identified during botanical surveys (Sycamore Environmental 2009) and other biological field surveys. During botanical surveys, all plant species were identified and determined whether native or introduced. Noxious weeds reported from the site are discussed below.

3.4. Known and Potential Weed Occurrences

The noxious weeds occurring in the project site are Sahara mustard (*Brassica tournefortii*), Mediterranean grass (*Schismus* spp.), and filaree (*Erodium cicutarium*). Table 1 is a list of observed and potentially occurring noxious weeds at the RSEP. Noxious weed species listed

in Table 1 were compiled from 1) noxious weeds known to occur at the RSEP site, 2) noxious weeds of particular concern to BLM, 3) noxious weeds on Mojave and Low Desert Weed Management Area weed lists, 4) invasive plants on the Cal-IPC (2006) list, and 5) noxious weed species that have been found at similar project sites in the region. In addition, the California Department of Food and Agriculture Noxious Weed List (CDFA 2010a) and Nevada Department of Agriculture Noxious Weed List (NDA 2005) were consulted. The Consortium of California Herbaria (CCH 2010) was queried for collections of noxious weeds/ invasive species in the vicinity of the RSEP site. The potential for new weed species to colonize the RSEP site is addressed in Section 5.2.

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Table 1. Observed and Potentially Occurring Noxious Weeds at RSEP

Scientific Name	Common Name	CDFA Rank [1]	Overall Cal-IPC Rating [2] (Impacts, Invasiveness; Distribution)	Habitats Colonized [3]	Likelihood of Colonization at RSEP [4]	Consequence of Colonization at RSEP [5]
Alhagi pseudalhagi (=A. maurorum, A. camelorum)	Camel thorn	A	Moderate (B,B,B)	Grassland, meadows, riparian and desert scrub, Sonoran thorn woodland. Very invasive in southwestern states. Limited distribution in CA.	Low	High
Avena barbata	Slender wild oat	Not listed	Moderate (B,B,A)	Coastal scrub, grasslands, oak woodland, forest. Very widespread, but impacts more severe in desert regions.	Low	Moderate
Avena fatua	Wild oat	Not listed	Moderate (B,B,A)	Coastal scrub, chaparral, grasslands, woodland, forest. Very widespread, but impacts more severe in desert regions.	Low	Moderate
Brassica tournefortii	Sahara mustard	Not listed	High (A,A,B)	Desert dunes, desert and coastal scrub.	High; (Inhabits site currently)	Low to nonexistent
Bromus diandrus	Ripgut brome	Not listed	Moderate (B,B,A)	Dunes, scrub, grassland, woodland, forest.	Low	Moderate
Bromus madritensis ssp. *rubens*	Red brome	Not listed	High (A,B,A)	Scrub, grassland, desert washes, woodlands.	Medium	Moderate
Bromus tectorum	Cheat grass, downy brome	Not listed	High (A,B,A)	Interior scrub, woodlands, grasslands, piñon/ Joshua tree woodland, chaparral.	Medium	Moderate
Centaurea melitensis	Tocalote	Not rated	Moderate (B,B,B)	Grasslands, oak woodland; impacts vary regionally.	Low	Low to nonexistent
Centaurea	Yellow star-thistle	C	High	Grasslands, woodlands,	Low	Low to nonexistent

solstitialis			(A,B,A)	occasionally riparian.		
Convolvulus arvensis	Bindweed, orchard morning-glory	C	Evaluated but not listed (C,B,B)	Only known as agricultural weed.	Low	Low to nonexistent
Cynodon dactylon	Bermuda grass	C	Moderate (B,B,B)	Riparian scrub in southern CA. Common landscape weed, but can be very invasive in desert washes.	Medium	Moderate
Descurainia sophia	Flixweed, tansy mustard	Not listed	Limited (C,B,B)	Scrub, grassland, woodland. Impacts appear to be minor but locally more invasive in northeast CA.	Medium	Low to nonexistent
Erodium cicutarium	filaree	Not listed	Limited (C,C,A)	Many habitats. Widespread. Impacts minor in wildlands. High-density populations transient.	High; (Inhabits site currently)	Low to nonexistent
Halogeton glomeratus	Halogeton	A	Moderate (B,A,B)	Scrub, grasslands, pinyon-juniper woodland. Larger problem in NV.	Medium	Low to nonexistent
Hordeum marinum	Mediterranean barley	Not listed	Moderate (B,B,A)	Grasslands; *H. marinum* invades drier habitats, while *H. murinum* invades wetlands.	Low	Moderate
Linaria genistifolia ssp. dalmatica (=L. dalmatica)	Dalmatian toadflax	A	Moderate (B,B,B)	Grasslands, forest clearings. Limited distribution. More severe impacts in other western states.	Low	Low to nonexistent
Pennisetum setaceum	Fountain grass	Not rated	Limited (C,C,B)	Present at low levels in numerous wildland habitats; common turf weed.	Medium	Low to nonexistent
Salsola paulsenii	Barbed-wire Russian thistle	C	Limited (C,C,C)	Desert and Great Basin scrub. Limited distribution. Impacts in desert appear to be minor.	Medium	Moderate
Salsola tragus; S. kali; S. pestifer	Russian thistle; tumble weed	C	Limited (C,B,B)	Desert dunes and scrub, alkali playa. Widespread. Impacts minor in wildlands.	Medium	Moderate
Schismus arabicus; Schismus barbatus	Mediterranean-grass	Not listed	Limited (B,C,A)	Scrub, thorn woodland. Widespread in deserts.	High; (Currently inhabits site)	Low to nonexistent

Sisymbrium irio	London rocket	Not listed	Moderate (B,B,A)	Scrub, grasslands; primarily in disturbed sites. Widespread.	Medium	Moderate
Solanum elaeagnifolium	White horse-nettle	B	Evaluated but not listed (D,B,C)	Primarily agricultural weed, but escaping to wildlands in other countries.	Low	Low to nonexistent
Stipa capensis	Cape ricegrass	Not listed	Moderate (B,B,D)	Desert scrub; first recorded in CA 1995. Limited distribution, but spreading rapidly in CA deserts.	Medium	Moderate
Tamarix ramosissima and other *Tamarix* spp.	Tamarisk, salt cedar	B	High (A,A,A)	Desert washes, riparian areas, seeps, and springs.	Medium	High
Tribulus terrestris	Puncture vine	C	Not evaluated	Roadsides, railways, vacant lots, other dry, disturbed areas (Hickman 1993).	Medium	Low to nonexistent

[1] **CDFA ratings**:
A=Eradication, containment, rejection, or other holding action at the state-county level. Quarantine interceptions to be rejected or treated at any point in the state; B=Eradication, containment, control or other holding action at the discretion of the commissioner; C=State endorsed holding action and eradication only when found in nursery; action to retard spread outside of nurseries at the discretion of the commissioner—reject only when found in a crop seed for planting or at the discretion of the commissioner (CDFA 2010b).

[2] **Cal-IPC ratings**:
"High" – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed.
"Moderate" – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, although establishment is generally dependent on ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
"Limited" – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic (Cal-IPC 2006).

[3] Habitats colonized based on Cal-IPC (2006).

[4] Likelihood of colonization based on 1) presence within or adjacent to RSEP site (Sycamore Environmental 2009), 2) habitat requirements (Cal-IPC 2006), and 3) known records in the vicinity (CCH 2010).

[5] Consequence of colonization based on 1) matching of habitat colonized (Cal-IPC 2006 with surrounding habitat (Sycamore Environmental 2009), 2) known impacts in desert context (Cal-IPC 2006), and 3) presence in and around RSEP site (Sycamore Environmental 2009).

Chapter 4. Monitoring and Survey Methods

4.1. Weed Identification

Monitoring and removal of weeds requires skill and training in plant identification. Training in plant identification and field manuals with photographs of native desert species and of common weeds will be provided to all field staff including biological monitors, weed abatement contractors, plant operators and staff, and construction workers. Online resources including the following:

- The California Invasive Plant Council website is at http://www.cal-ipc.org. contains an invasive plant database, plant profiles, and other information on invasive plants and their control.
- The U.S. Department of Agriculture (USDA) National Invasive Species Information Center is at http://www.invasivespeciesinfo.gov/. This website has information on invasive species and links to the USDA PLANTS database (http://plants.usda.gov/), with species profiles and photographs.
- The Mojave Weed Management Area website (http://www.mojavewma.org/) has information on common weeds in the area.
- BLM maintains a website on noxious weeds, including management strategies for weeds in California (http://www.blm.gov/weeds/).
- The California Native Plant Society maintains a database on California vegetation including rare, threatened, and endangered species (http://www.cnps.org/).
- The University of California digital library at http://www.calflora.org/ contains species information and an extensive photo collection.
- The Center for Invasive Plant Management maintains a website with information and resources, including plant profiles; http://www.weedcenter.org/.
- *Weeds of the West* by Tom D. Whitson contains information useful for weed identification.

4.2. Surveys and Monitoring

4.2.1. Monitoring Methods

Monitoring and scheduled surveys will be conducted during times and at locations where noxious weed recruitment is more likely (e.g., during and immediately after construction, during the growing season, and where soil disturbance has occurred). Special emphasis will be given to areas vulnerable to colonization including: roadsides, soil stockpiles, wash stations; previously disturbed areas, areas of prior weed infestation, areas near known weed infestations, and all areas with disturbed soils. Table 2 is a summary of the project phases and noxious weed monitoring and surveys that will be performed.

Table 2. Summary of Noxious Weed Survey and Monitoring Requirements at RSEP.

Location or Phase	Noxious Weed Monitoring	Noxious Weed Surveys (Complete Coverage)	Reporting Requirements
Construction Phase (24 to 30 months beginning first quarter 2011)	Ongoing by trained biological monitors. Includes bi-weekly inspections of areas vulnerable to noxious weed colonization.	Two times annually (Spring and Fall) by qualified biologist or botanist.	The ECM will prepare monthly monitoring reports.
Operational Phase (Anticipated 30 years beginning third quarter 2013)	Ongoing by trained grounds personnel.	Two times annually (Spring and Fall) by a qualified botanist or biologist for first 3 years of operational phase. Thereafter, for life of project, two times annually (Spring and Fall) by trained grounds personnel.	RSEP designee will prepare yearly monitoring reports.
Site Closure	TBD in closure plan.	TBD in closure plan.	TBD in closure plan.

4.2.1.1. CONSTRUCTION PHASE

The introduction and establishment of noxious weeds are more likely to occur during the construction phase than during the operational phase of the RSEP. Construction of the facility site will occur over approximately 24 to 30 months beginning in the first quarter of 2011. During this time, the ECM will oversee biological monitors present during project construction that will conduct general monitoring for noxious weeds. Scheduled noxious weed surveys will be conducted by trained biological monitors or qualified botanists or biologists.

General monitoring for noxious weeds will be conducted by biological monitors trained in noxious weed identification (See Section 5.4.1 for training requirements). Biological

monitors will perform a broad range of monitoring activities associated with environmental compliance, including inspections for noxious weeds and sources of noxious weed introduction. Biological monitors will be responsible for inspecting all active and previously active construction areas, defined as those areas which have experienced construction-related soil disturbance. Biological monitors will record the presence of noxious weeds, and inspect wash stations for weed seed removal. Noxious weed occurrences and wash station maintenance needs will be reported to the ECM. The ECM will be responsible for prescribing management activities if weeds become established.

If not accomplished during the ordinary duties of biological monitors, staging areas, main access roads, and areas receiving supplemental water shall be visually inspected for noxious weeds at least every other week during the construction phase. If noxious weeds are discovered, biological monitors shall implement those measures specified in Section 5.4.3 (Infestation Containment and Control). See Chapter 6 for reporting requirements.

Scheduled noxious weed surveys will be conducted two times annually (Spring and Fall) during the construction phase, beginning with the first ground disturbing activity at the RSEP site and ending with the operational phase. Scheduled noxious weed surveys will be conducted by biological monitors trained in the identification of noxious weeds or by qualified botanists or biologists.

Scheduled noxious weed surveys will consist of walking or driving slowly over construction areas and searching for seedlings of noxious weed species. Perimeters of construction areas will be inspected in their entirety. Within construction areas, surveys will consist of inspection of all roads and paths and all structure bases, including all fences. For areas without roads and paths, inspection shall occur along transects spaced approximately 200 ft apart. Thus, at minimum, all construction areas shall be visually inspected from distances closer than 100 ft (one-half the distance between transects). All fence bases, artificial berms, wash stations, detention basins, evaporation ponds, areas of heliostat wash overflow, leach fields, access and maintenance roads, and other facility components potentially catching noxious weed seeds or providing exceptional noxious weed habitat will be inspected during scheduled noxious weed surveys.

While conducting scheduled surveys, surveyors will stop and investigate any potential noxious weed species. Potential noxious weed species identity, life stage, infestation extent, and location shall be recorded and photographs of the infestation shall be taken. See Chapter 6 for reporting requirements.

4.2.1.2. OPERATIONAL PHASE

The RSEP site, including the transmission line and substation, will remain susceptible to noxious weed colonization after construction during the operational phase (anticipated to begin the third quarter of 2013 and last approximately 30 years). The probability of colonization during this phase is expected to be much reduced compared to the construction phase due in part to reduced vehicle traffic, soil disturbance, and volume and diversity of imported materials. Monitoring during this phase will be conducted on both an ongoing basis and during scheduled surveys for noxious weed species.

General monitoring for noxious weeds will be conducted on an ongoing basis by grounds personnel trained to identify weedy and native species (See Section 5.4.1 for training requirements). Grounds personnel will report suspected noxious weed occurrences and information about these weed occurrences to the Facility Manager, who will prescribe control measures described in Chapter 5 (Noxious Weed Management).

Scheduled surveys for noxious weeds will be conducted by a qualified botanist(s) or biologist(s). Scheduled surveys will occur two times a year (Spring and Fall) for the first three years following completion of construction, and twice annually (Spring and Fall) thereafter, until site closure. Aside from timing, methods for scheduled surveys for noxious weeds conducted during the operational phase will be the same as those described above for the construction phase.

Construction Laydown Area Revegetation

The construction laydown area revegetation program and its standards for revegetation success will be included in the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) for RSEP. Monitoring methods for noxious weeds in revegetation areas will depend on the amount of irrigation used, the type of revegetation method employed (i.e., active vs. passive), timing of revegetation, and other factors. Monitoring frequency in revegetation areas will be described in the BRMIMP, but shall not be less than quarterly during the first year following any active revegetation, and twice annually after that for a total of 5 years. Monitoring schedules will be sufficiently flexible to account for the variable precipitation regime of the Sonoran Desert. Surveys will identify weed species observed, locations noxious weeds occur, and noxious weed life stage.

4.2.2. Database and Mapping

Locations of noxious weed occurrences, with data on species, detection date, growth stage, infestation extent, treatments implemented, results of treatment, and current status will be maintained by the ECM or ECM designee during the construction and operational phases.

This will not be a requirement for Sahara mustard (*Brassica tournefortii*) or Mediterranean grass (*Schismus* spp.), since these species currently occur in high abundance throughout the RSEP site. Sites vulnerable to colonization by noxious weeds will be recorded. A geographic information system (GIS) will be used to map and store data and will be included in reports (see Chapter 6).

4.2.3. Prioritization for control

Where resources are limited and multiple weed management needs arise concurrently, weed populations and infestation areas should be prioritized for control. The priority of infestation areas will be established based on species, land ownership, vulnerability of the site to invasion, growth stage, and anticipated effectiveness of treatment. Weeds new to the region will be given high priority. Weed infestations in project staging areas, operating areas, and along access routes shall be high priority. Noxious weeds populations occurring on the segment of the transmission line that crosses BLM land shall be given high priority. Noxious weed populations within areas mapped as vulnerable to weed invasion or that threaten revegetation or rehabilitation of an area will also be given high priority. Weeds common within and surrounding the RSEP site will generally be given low priority (i.e., *Brassica tournefortii*, *Schismus* spp.).

Chapter 5. Noxious Weed Management

5.1. Species Descriptions and Management Strategy

Descriptions of the more common or troublesome noxious weeds known to occur or that could colonize the RSEP site are discussed in this section, along with the basic weed management strategy applicable to each. Table 1 provides a complete list of the current weed species of concern. Table 2 provides additional information on management strategy and control methods for observed and potentially occurring noxious weed species. Management strategies must encompass not only the objective, but also identify the means of achieving the objective and the plant species to be controlled.

Not all invasive plant species should be eradicated. Some invasive plants or noxious weeds have little or no impact on undisturbed ecosystems and eradication of widespread species can be ineffective and wasteful. The three common exotic species on and surrounding the RSEP site (e.g. *Brassica tournefortii*, *Schismus* spp., *Erodium cicutarium*) will be controlled only when they threaten revegetation or restoration. Complete eradication of established infestations over a large area is extremely difficult and resource intensive (Rejmánek & Pitcairn 2002) and would likely adversely affect other native species. The RSEP site and surrounding areas are a source propagules for the three common weed species mentioned above. These species would be expected to rapidly recolonize the area following any attempt to control them at the RSEP site. Attempting to control these species could slow site rehabilitation by slowing the rate of succession and surface stabilization. In addition, these species can play a beneficial role in accelerating surface stabilization and, therefore, reduce soil erosion caused by sheet flow or high winds.

The following list provides brief descriptions of the weed species with greater likelihoods of colonizing the RSEP site:

- **Sahara mustard** (*Brassica tournefortii*) was observed throughout the facility site and along the transmission line. It was also present throughout all areas inspected adjacent to the project site. The ecological impact of Sahara mustard has been rated "high" by Cal-IPC (2006). Sahara mustard can colonize washes and undisturbed coppice mounds beneath desert shrubs where soil nutrients are high. It also grows well on road berms (Cal-IPC 2003a). Because eradication of this species from the site is infeasible, the management strategy for this species involves suppression, not

eradication. However, Sahara mustard will be specifically targeted for control if it threatens revegetation or rehabilitation efforts.

- **Red brome** (*Bromus madritensis* ssp. *rubens*) is an introduced Eurasian grass adapted to warmer habitats that is frequently found at the base of desert shrubs. This annual species was not observed in the project area. It can also form carpet cover on fine-grained microhabitats in rough terrain on bajadas after wet years. Seeds from this species can disperse readily and across large distances. Stands of red brome have played an important role in accelerating wildfires in desert scrub communities (Brooks 1999); a deleterious effect partly because warm-desert plant communities are ill-adapted to fire (Brown and Minnich, 1986). The ecological impact of red brome has been rated "high" by Cal-IPC (2006). It is widespread in the Mojave Desert and has been collected in the Whipple Mountains (CCH 2010), but is not currently known from the RSEP site. If this species becomes established at RSEP, it will be eradicated.

- **Cheat grass** (*Bromus tectorum*) is among the most widely distributed invasive plant species in the western U.S. This annual species was not observed in the project area. Cheat grass is an annual that crowds out natives and may increase the frequency and extent of wildfires (Cal-IPC 2003b). It reproduces only by seed, which can remain viable for up to three years. It generally spreads by wind, attachment to human clothing or animal fur, hay transport, or machinery transport. The ecological impact of cheat grass has been rated "high" by Cal-IPC (2006). If this species becomes established at RSEP, it will be eradicated.

- **Bermuda grass** (*Cynodon dactylon*) invades river banks, stream beds, and washes in arid regions (Cal-IPC 2004a). This perennial species was not observed in the project area. It can be transported long distances as a contaminant in hay, livestock feed, and soil, and by mowing equipment and vehicles. Bermuda grass seeds and rhizomes are known to be dispersed by wind and water, respectively. Ants act as short distance dispersal vectors (Cal-IPC 2004a). The ecological impact of Bermuda grass has been rated "moderate" by Cal-IPC (2006). If this species becomes established at RSEP, it will be eradicated.

- **Flixweed** or tansy mustard (*Descurainia sophia*) is an early successional species which may decline in dominance as native species re-establish or may persist indefinitely in riparian areas that experience regular natural disturbance. This annual species was not observed in the project area. This species occurs in habitat openings caused by natural or anthropogenic disturbances. Each plant can produce up to

700,000 seeds annually that can be dispersed on vehicles (Cal-IPC 2004b). The ecological impact of flixweed has been rated "limited" by Cal-IPC (2006). If this species becomes established at RSEP, it will be eradicated.

- **Filaree** or storksbill (*Erodium cicutarium*) is a widespread annual species common in disturbed habitats and was observed along Hwy 62 at the RSEP site. It can form dense, transient populations when conditions are suitable. The ecological impact of filaree has been rated "limited" by Cal-IPC (2006). The management objective for filaree at the RSEP site is suppression. Because of its widespread distribution, filaree is not considered feasible for general control. Weed abatement measures are required only when filaree threatens restoration or revegetation of the RSEP site.

- **Halogeton** (*Halogeton glomeratus*) is well-adapted to saline-alkaline soils in salt-desert shrubland. This annual species was not observed in the project area. Halogeton establishes in disturbed areas following overgrazing and mechanical soil disturbance. Each plant can produce over 110,000 seeds annually that can remain viable for 2-10 years. Halogeton seed is often spread by attaching to vehicles and equipment, and may colonize areas following road construction (Cal-IPC 2004c). The ecological impact of halogeton has been rated "moderate" by Cal-IPC (2006). If this species become established at RSEP, it will be eradicated.

- **Fountain grass** (*Pennisetum setaceum*) is known from Sonoran Desert scrub, desert riparian, desert wash, grasslands, chaparral, and from along roadsides and trials in desert areas. This perennial species was not observed in the project area. It is most commonly found in areas with anthropogenic or natural disturbance. It is adapted to fire and can increase fuel loads and therefore frequency, intensity, and spread of fire. Seeds are dispersed via wind, water, and birds (Cal-IPC 2004d). The ecological impact of fountain grass has been rated "limited" by Cal-IPC (2006). If this species becomes established at RSEP, it will be eradicated.

- **Russian thistle** or tumbleweed (*Salsola tragus*; *Salsola* spp.) tends to be restricted to roadway shoulders and areas of recent soil disturbance. This species was not observed at the project site. The ecological impact of Russian thistle has been rated "limited" by Cal-IPC (2006). If any tumbleweed (*Salsola* spp.) becomes established at RSEP, it will be eradicated.

- **Mediterranean grass** (*Schismus* spp.) was observed throughout much of the project site. The ecological impact of Mediterranean grass has been rated "limited" by Cal-

IPC (2006). Because of the widespread distribution of Mediterranean grass, this species is not considered feasible to control. Weed abatement efforts for Mediterranean grass will not be required at RSEP.

- **London rocket** (*Sisymbrium irio*) is widespread throughout the warm deserts of North America. It has been collected in areas throughout the Sonoran Desert (CCH 2010) but is not known from the project site. The ecological impact of this species has been rated "moderate" by Cal-IPC (2006). If this species becomes established at RSEP, it will be eradicated.

- **Cape ricegrass** or spear grass (*Stipa capensis*) inhabits desert and semi-desert areas but is not yet widely distributed in California. This species was not observed in the project area. Germination is usually occurs after the first rains in October or November and flowering begins in March or April. It may disperse by adhering to equipment or clothing and could increase fire frequency (Cal-IPC 2005). The ecological impact of cape ricegrass has been rated "moderate" by Cal-IPC (2006). If this species becomes established at RSEP, it will be eradicated.

- **Tamarisk** or salt cedar (*Tamarix ramosissima,* and other *Tamarix* spp.) is a riparian plant and is generally restricted to microhabitats where there is perennial groundwater saturation such as springs and seeps, or runoff from poorly maintained water pipelines or well pumps. This species was not observed in the project area. The ecological impact of tamarisk has been rated "high" by Cal-IPC (2006). If this species become established at RSEP, it will be eradicated.

- **Puncture vine** (*Tribulus terrestris*) occurs in roadsides, railways, vacant lots, and other dry, disturbed areas. This species was not observed in the project area. Cal-IPC has not evaluated this plant. Puncture vine has been a pernicious weed since introduction in 1902, but is now controlled by introduced weevils (Hickman 1993). This species may disperse by adhering to construction equipment and people, particularly on wheels and shoes. CDFA (2010a) has given this plant a "C" rating. If this species becomes established at RSEP, it will be eradicated.

5.2. New Weeds

Weeds not identified in Table 1 could colonize areas at the RSEP site during both construction and operation. During construction, the ECM will be required to update the list of potential noxious weeds quarterly with any new potential threats. The ECM will consult

Cal-IPC's published list of "red-alert" species (Cal-IPC 2010), BLM's weed page (http://www.blm.gov/ca/st/en/prog/weeds.html), and local weed management area webpages (http://www.mojavewma.org/) when updating the list of potential noxious weeds. The ECM will develop a management strategy and control methods appropriate to the species and the nature of the invasion.

Table 3. Management Strategies and Control Methods for Observed and Potentially Occurring Noxious Weeds at RSEP

Scientific Name	Common Name	Management Strategy	Control Method
Alhagi pseudalhagi (=A. maurorum, A. camelorum)	Camel thorn	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.3, Physical Removal of Weeds (Hand Pulling).
Avena barbata	Slender wild oat	**Eradication** Monitor for occurrence; eradicate if found.	**Stands**: Spray with post-emergent, systemic, selective (monocot) herbicide; after senescence, if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Avena fatua	Wild oat	**Eradication** Monitor for occurrence; eradicate if found.	**Stands**: Spray with post-emergent, systemic, selective (monocot) herbicide; after senescence, if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Brassica tournefortii	Sahara mustard	**Suppression** Suppress seed set within project, especially at staging areas, along access routes, and along project boundaries and where site rehabilitation is threatened; eradication infeasible.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds (Hand Pulling). **Stands**: Spray with post-emergent herbicide; emphasis should be on timing to reduce the volume of seeds reaching maturity. See Section 5.5.3, Chemical Methods for Weed Removal.
Bromus diandrus	Ripgut brome	**Eradication** Monitor for occurrence; eradicate if found.	**Stands**: Spray with post-emergent, systemic, selective (monocot) herbicide; after senescence, if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Bromus madritensis ssp. *rubens*	Red brome	**Eradication** Monitor for occurrence; eradicate if found.	**Stands**: Spray with post-emergent, systemic, selective (monocot) herbicide; after senescence, if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Bromus tectorum	Cheat grass, downy brome	**Eradication** Monitor for occurrence; eradicate if found.	**Stands**: Spray with post-emergent, systemic, selective (monocot) herbicide; after senescence, if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Centaurea melitensis	Tocalote	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds.
Centaurea solstitialis	Yellow star-thistle	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds.
Convolvulus arvensis	Bindweed, orchard	**Eradication** Monitor for occurrence; eradicate if	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds.

	morning-glory	found.	
Cynodon dactylon	Bermuda grass	**Eradication** Monitor for occurrence; eradicate if found.	**Stands**: Spray with post-emergent, systemic, selective (monocot) herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Descurainia sophia	Flixweed, tansy mustard	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds (Hand Pulling).
Erodium cicutarium	filaree	**Suppression** Suppress seed set within project and along project boundaries only when rehabilitation threatened; eradication infeasible.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds (Hand Pulling). **Stands**: Spray with post-emergent systemic selective herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Halogeton glomeratus	Halogeton	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds (Hand Pulling). **Stands**: Spray with post-emergent herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Hordeum marinum	Mediterranean barley	**Eradication** Monitor for occurrence; eradicate if found.	**Stands**: Spray with post-emergent, systemic, selective (monocot) herbicide; after senescence, if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Linaria genistifolia ssp. dalmatica (=L. dalmatica)	Dalmatian toadflax	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds. **Stands**: Spray with post-emergent herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Pennisetum setaceum	Fountain grass	**Eradication** Monitor for occurrence; eradicate if found.	**Stands**: Spray with post-emergent, systemic, selective (monocot) herbicide; after senescence, if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Salsola paulsenii	Barbed-wire Russian thistle	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds (Hand Pulling). **Stands**: Spray with post-emergent herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Salsola tragus; S. kali; S. pestifer	Russian thistle; tumble weed	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds (Hand Pulling).

			Stands: Spray with post-emergent herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Schismus arabicus; Schismus barbatus	Mediterranean-grass	**No action** Allow colonization as pioneer species in revegetation areas; suppress only if species becomes barrier to revegetation objectives; eradication infeasible.	**Stands**: Spray with post-emergent, systemic, selective (monocot) herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Sisymbrium irio	London rocket	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds (Hand Pulling). **Stands**: Spray with post-emergent herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Solanum eleagnifolium	White horse-nettle	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds (Hand Pulling). **Stands**: Spray with post-emergent herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Stipa capensis	Cape ricegrass	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds (Hand Pulling). **Stands**: Spray with post-emergent herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal.
Tamarix ramosissima and other *Tamarix* spp.	Tamarisk, salt cedar	**Eradication** Monitor for occurrence, especially around evaporation ponds, detention basin, and heliostat field; eradicate if found.	**Mature Trees**: Cut trees and promptly apply 100 percent herbicide to cut stem; spray new shoots. See Section 5.5.2, Chemical Methods for Weed Removal. **Saplings**: Pull out entire plant and root. See Section 5.5.3, Physical Removal of Weeds.
Tribulus terrestris	Puncture vine	**Eradication** Monitor for occurrence; eradicate if found.	**Individual Plants**: Pull out entire plant and root and bag for disposal. See Section 5.5.2, Physical Removal of Weeds (Hand Pulling). **Stands**: Spray with post-emergent herbicide; after senescence and if seed reached maturity, remove with flail mower and bag for disposal. See Section 5.5.3, Chemical Methods for Weed Removal

5.3. Site-Specific Weed Management Strategies

Weed management strategies may change depending on factors described in this section. Soil disturbance during construction will create habitat suited to colonization by invasive weed species. Therefore, measures to minimize the potential for weed introduction by personnel and equipment are needed.

5.3.1. Temporary Disturbance Areas

Temporarily disturbed areas will occur during construction in the temporary logistics area between SR 62 and the facility site, along the perimeter of the fenced 1,410-acre facility site, around the 300 x 400-foot substation, and along the 10-mile, 230-kV transmission line between the southeast corner of the facility site and the existing Western Blythe-Parker transmission line. These temporarily disturbed areas and their weed management concerns are discussed below. Target weed species are discussed in Chapter 3, monitoring frequency and methods in Chapter 4, and control methods in Section 5.5 of this Chapter.

Facility Site and Substation Perimeters

Some areas outside the final 1,410-acre fenced facility site are anticipated to be temporarily disturbed by grading. A drainage swale will be constructed outside the perimeter fence surrounding the project. The drainage swale will be treated as a temporarily disturbed area for the purposes of weed management. The new substation will be surrounded by a chain-link security fence with attached tortoise exclusion fencing. Areas around the substation will be temporarily disturbed during its construction. Regular weed monitoring and management during construction will be required in the perimeter areas outside the fence around the facility site and the substation. After construction, the base of fences will be susceptible to weed recruitment since they may trap wind-blown seeds and sediment. All perimeter fences will be inspected during scheduled noxious weed surveys (Section 4.2.1).

Transmission Line

The transmission line will require construction of a 4.6-mile-long, 12-foot-wide dirt access road, the margins of which will be temporarily disturbed. The remaining 5.4 miles of the transmission line will follow the existing Rice Valley Road, which may require improvement that would include temporary disturbance. The area around the approximately 90 new transmission line poles is expected to create an environment conducive to weed recruitment and survival. Weed monitoring and management will be required at all transmission line poles and access roads after the poles have been installed (Section 4.2.1). Herbicides will not be applied along the transmission line corridor.

Temporary Logistics Area

A temporary logistics area will be located between the heliostat field and SR 62. This area will be temporarily fenced and will include a temporary 11-acre parking area, 31-acre RV trailer park for construction workers, 18-acre construction office site, and heliostat assembly area. This area will be temporarily disturbed and will receive and process materials from off-site. As a result, if noxious weeds establish at RSEP, they are likely to do so in the temporary logistics area before other areas. General weed monitoring and scheduled noxious weed surveys will target the temporary logistics area (Chapter 4). Weed management will abide by standards required for weed management near people and their dwellings.

Structures built in the temporary logistics area will be removed after plant construction. This area will then be restored with the same weed monitoring and management requirements of other temporary disturbance and revegetation areas. Particular attention will be paid to any wash stations located in this area as weed propagules may spread from wash stations into surrounding habitats.

Other Areas Temporarily Disturbed

Weed monitoring and management will be conducted at all temporarily disturbed sites. Temporarily disturbed areas not mentioned above that will be targeted during weed surveys include construction staging areas and temporary access roads. Improvements to existing roads associated with the RSEP may result in temporary disturbance and these areas shall also be monitored and managed for noxious weeds.

5.3.2. Permanent Facilities

The areas described in this section would be permanently developed, but could support weedy species along peripheral disturbed areas and function as seed reservoirs to adjacent natural habitats if not managed.

Heliostat Field

The heliostat field occupies 1,370 acres. Vegetation in most of this area will be cut during construction. Soil disturbance will take place at the heliostat bases and roadways between the rows of heliostats. After the heliostat arrays are in place, disturbance will be limited to heliostat maintenance and access road maintenance. A 30-acre-foot detention basin located in the southern portion of the heliostat field may receive supplemental water from heliostat washing and will be monitored for weeds.

Soil disturbance during construction of the heliostat field will create habitat suited to colonization by weed species. This area will require ongoing weed monitoring and

management during construction (See Chapter 4), and all equipment arriving from off-site or infested areas on-site will require cleaning at wash stations as specified below.

During operations, equipment and personnel will access the area for heliostat cleaning and other maintenance. Mirrors will be washed periodically. Wash water overflow will facilitate the germination of weed seeds. Areas receiving wash water will require continual weed management (See Chapter 4). Pre-emergent herbicides will be used to inhibit weed germination and establishment in the heliostat field (See Section 5.5.3).

Roads

Roadsides and the medians of infrequently used, unpaved roads (such as heliostat service roads) are vulnerable to weed invasion. Roads can alter local hydrology and are subject to initial and ongoing disturbance during construction, maintenance, and use. Roads provide topographic variation that can capture wind or waterborne seed and may be subject to seed distribution from passing vehicles. Ongoing weed management will target roadside weeds during operation of RSEP. Roads receiving supplemental water, either from heliostat washing or washing stations may be treated with pre-emergent herbicide.

Evaporation ponds

Three evaporation ponds are planned south of the heliostat field. Pond perimeters will be monitored for weeds during the life of the project.

Other Permanent Facilities

Areas around administrative and maintenance buildings and pockets of open ground in or around permanent, hard surfaces throughout the RSEP site may be regarded as permanently developed, but have the capacity to collect noxious weed propagules. Where soil is capped in areas adjacent to these pockets, plant-available water and nutrients will be elevated, potentially promoting the establishment of noxious weeds. As a consequence, these areas will be targeted during general monitoring and scheduled surveys for noxious weeds.

Landscaped Areas

No landscape areas are planned or anticipated at the RSEP site.

5.4. Preventive Measures

Preventive Measures to avoid the spread of weed propagules and inhibit their germination include the following:

- Limiting disturbance areas during construction to the minimum required to perform work and limiting ingress and egress to defined routes.

- Maintaining vehicle wash and inspection stations, and closely monitoring the types of materials brought onto the site to minimize the potential for weed introduction.

- Reestablishing vegetation as quickly as practicable on disturbed sites to rapidly generate a competitive environment that will reduce future weed infestations.

- Monitoring and rapid implementation of control measures to ensure early detection and eradication of weeds.

5.4.1. Worker Environmental Training

During the construction phase, noxious weed management will be incorporated as a part of mandatory training for all contractors, subcontractors, inspection personnel, construction managers, construction personnel, and individuals bringing vehicles or equipment onto the site. During the operational phase, noxious weed management will be incorporated as a part of mandatory site training for groundskeepers and maintenance personnel.

Training will include weed identification and an explanation of why noxious weed management is important. Impacts of noxious weeds on native vegetation, wildlife, and fire activity will be discussed including an explanation of how invasive grasses provide a fine fuel understory which can spread fire from shrub to shrub and how fires have historically been absent in desert ecosystems. Measures to prevent the spread of noxious weeds will also be explained.

5.4.2. Wash Stations

To prevent the spread of weed species into new habitats, wash stations will be set up in staging areas to remove any dirt or mud attached to construction vehicles that may contain weed seeds. Alternatively, vehicles may be washed off-site. Vehicles arriving at the construction parking, laydown, or trailer area outside the location of the permanent fence will not require washing.

On-site wash station locations will be determined during final design, but will be located outside construction areas. All vehicles arriving from off-site locations will be required to stop for inspection. Vehicles that have not been washed off-site will be required to be cleaned before entering the site. Vehicles that were washed off-site but which appear to the inspector to have accumulations of mud or debris on the vehicle or equipment that could harbor weed seeds, will be required to be cleaned before entering the site. Heavy equipment entering the site on trailers must also be cleaned. The contractor, with ECM oversight, will ensure that

vehicles and equipment are free of soil and debris capable of transporting noxious weed seeds, roots, or rhizomes before the vehicles and equipment are allowed to use access roads. To avoid spreading Sahara mustard to new sites, construction equipment operated on-site will also be cleaned prior to leaving the site.

Wash stations will be located near the entrance to the RSEP site from SR 62 and will be constructed with either a concrete wash pad, or a completely cleared and compacted soil or gravel pad. Silt fencing, weed-free certified hay bales, or other means of trapping wash water sediment and seeds will be installed around the perimeter of wash stations. A conceptual design of a wash station is shown in Figure 3.

Vehicles will be washed with high-pressure water equipment. The wash-down will concentrate on tracks, tires, and the undercarriage, including axles, frame, cross members, motor mounts, and on and underneath steps, running boards, and front bumper/brush guard assemblies. Vehicle cabs will be swept out and refuse will be disposed of in waste receptacles. Sediment accumulated from the washing will be shoveled out daily and placed in a sealed container for disposal in a landfill. If removal requirements exceed the capability of the wash stations, equipment will be washed elsewhere before being allowed on the site.

Project workers will also inspect, remove, and dispose of weed seed and plant parts found on their clothing, shoes, and personal equipment. The material will be bagged and disposed in a landfill or incinerated.

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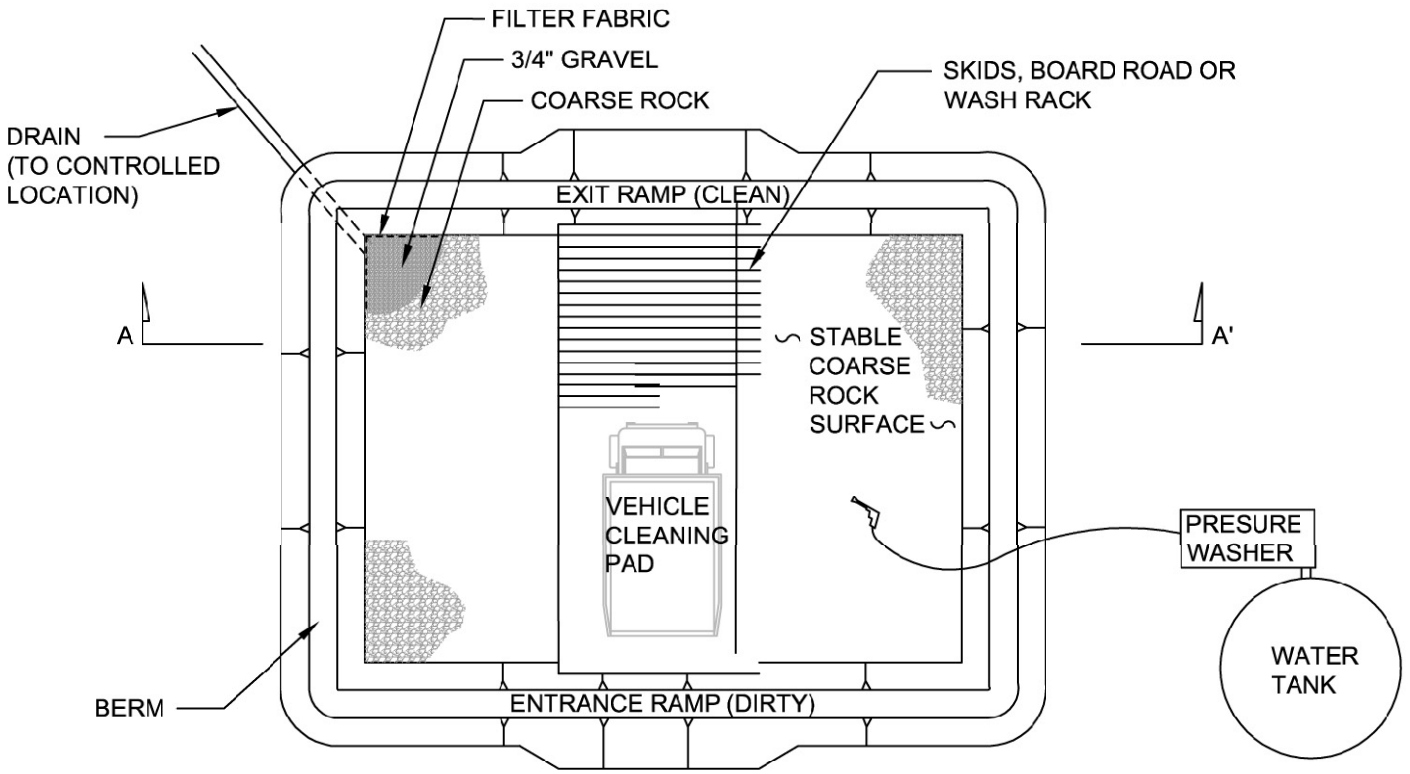
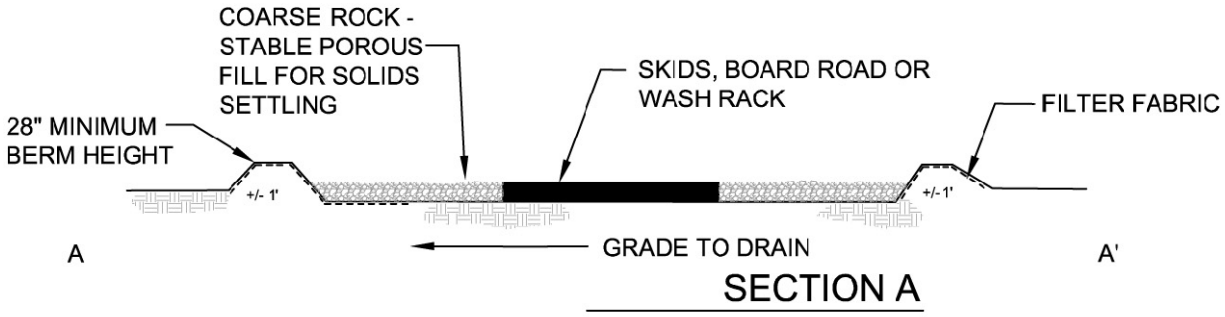
Rice Solar Energy Project
Riverside County, CA
27 April 2010

Figure 3. Conceptual Wash Station Plan





SYCAMORE Environmental Consultants, Inc.

Source:
Figure 3 Conceptual Wash Station Plan, Ivanpah Solar Electric Generating System, Data Response, Set 1F, CH2MHILL (6 Aug. 2008)

08099RiceWeedMgt_Fig3_ConceptualWashStation.mxd

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5.4.3. Infestation Containment and Control

During the construction phase, biological monitors will alert the ECM to areas containing noxious weeds. Biological monitors will flag these areas in order to alert construction personnel that weeds are present. The flag shall deliver the message that these areas are not to be entered until noxious weed management control measures have been implemented. Contractors will avoid or minimize all types of travel through weed-infested areas. Immediate control measures will be implemented as described in the sections below. The contractor will begin project operations in weed-free areas whenever feasible before operating in weed-infested areas, until the ECM has verified completion of weed treatments within weed-infested areas.

During operations, areas of concern will be identified and flagged by grounds keepers under the direction of the Facility Manager. The flagging will alert personnel that weeds are present and will prevent access into these areas until noxious weed management control measures have been implemented. Immediate control measures will be implemented as described below.

5.4.4. Site Soil Management

The contractor will avoid creating soil conditions that promote weed germination and establishment as practicable. Soil conditions that promote weed germination and establishment include soil excavation/disturbance, vegetation removal, soil compaction, loss or removal of topsoil, introduction of any chemical compounds, including fertilizer, soil watering, and soil stockpiling. In areas where infestations are identified, the contractor will stockpile cleared vegetation and salvaged topsoil adjacent to the area from which they are stripped to eliminate the transport of soil-borne noxious weed seeds, roots, or rhizomes. During reclamation, the contractor will return topsoil and vegetative material from infestation sites to the areas from which they were stripped. Soil will not be imported onto the site.

5.4.5. Weed-free Products

The contractor will ensure that straw or hay bales used for sediment barrier installations are certified as weed free. Additional products such as gravel, sand bags, silt fences, and mulch may also carry weeds. Such products will be obtained from suppliers who can provide weed-free certified materials. Where feasible, mulch will be generated from native vegetation cleared from the site itself.

5.4.6. Weed-free Seed

Preferably, seed will be collected from on-site as a part of the restoration of the construction laydown area. Collection of seed from on-site ensures both local genetic stock and seed free of noxious weeds not already known from the site. If seed purchased from commercial vendors is required for site restoration or revegetation, then the purchased seed will be labeled in compliance with the relevant provisions of the California Agriculture Code (See Section 2.2.1). Seed purchased from commercial vendors shall be required to be free of noxious weeds and the label should so state.

5.4.7. Site Reclamation

Site reclamation and revegetation will be performed on the construction laydown area. A full description of site reclamation and revegetation measures will be included in the RSEP BRMIMP. Rapid revegetation will be an effective method of long-term weed control.

5.4.8. Site Closure

Site decommissioning and closure will involve implementation of a revegetation and rehabilitation plan. The revegetation and rehabilitation will be submitted to the CEC for approval at least 1 year prior to site closure and will include measures to avoid weed establishment throughout the site, and to implement long-term site rehabilitation and revegetation of all decommissioned facilities. Control of noxious weed establishment will be a goal of long-term site rehabilitation. Revegetation measures promoting surface stability and competitive suppression of exotic weeds will be included in the revegetation and rehabilitation plan.

5.5. Eradication and Control Methods

5.5.1. Physical Removal of Weeds

Physical control methods range from manual hand pulling of weeds to the use of hand and power tools to uproot, girdle, or cut plants. The Weed Wrench™ and Root Jack™ are lever arms with cam devices that secure stems; they are sold in nurseries and online. They may be used to pull out woody shrubs such as tamarisk. Hand removal by pulling is appropriate when the plants are large enough that they will not break and leave the roots behind, which could resprout. For localized weed control, this is the most effective method. Hand removal should be focused on weed species that have a single-root mass, facilitating easy removal. Hand-

pulling is less effective in large areas and with weed species that spread through an underground root system (e.g., Bermuda grass).

Hoeing and weed-eating can be employed to control weeds in small areas. However, care must be employed when using these methods adjacent to native plants. Hoeing or weed-eating must only be employed before the seed has set, otherwise this disturbance will further disperse and promote the establishment of the weed species. Pertinent considerations for hoeing and weed-eating include the following:

- Hoeing works best on patches of small weeds and on weeds that have a single-root mass. It is less effective on larger weeds that can regenerate from cut roots. It should not be used on weeds approaching maturity, as seeds can mature and be released on cut plants. Hoed plant material should be bagged and removed.
- Weed-eating can be used for removal non-woody weeds. It should not be used on weeds approaching maturity, as seeds can mature and be released on cut plants. Cut plant material will be bagged and removed if there is any chance it harbors immature or mature seeds or other propagules.

5.5.2. Chemical Methods for Weed Removal

Herbicide applications are a widely employed, effective chemical control method used to achieve noxious weed management objectives. Only certain herbicides are approved for use by the EPA, and only a subset of these is approved for use on public land in California (Appendix B). This section describes the permitting and regulatory requirements relevant for chemical control of noxious weeds, the types of herbicides available, general application and handling procedures, specific herbicide application methods for pre- and post-emergent control.

5.5.2.1. PERMITTING AND REGULATORY REQUIREMENTS

Contractors applying herbicides must possess required permits from the state and Riverside County Agricultural Commissioner (as applicable). Permits may contain additional terms and conditions in addition to those described in this plan. Only a State of California and federally certified contractor will be permitted to perform herbicide applications. All herbicides will be applied in accordance with applicable laws, regulations, and permit stipulations. Only herbicides and adjuvants approved by the State of California and federal agency for use on public lands will be used within or adjacent to the project site. A list of approved herbicides and adjuvants is available in Appendix B.

Ten herbicides are acceptable for use on BLM lands (USDI 2007). Guidelines for their use are presented in the Chemical Pest Control Manual (BLM, n.d.). These guidelines require submittal of a pesticide use proposal (PUP) and pesticide application records (PAR) for the use of herbicides on BLM lands. A sample form required for the submittal of a PUP is included in Appendix C.

The transmission line occurs primarily on lands managed by the BLM. Herbicides will not be used on the transmission line portion of the project area. Herbicides may be used on the privately owned portion of the project area.

5.5.2.2. TYPES OF HERBICIDES

Herbicides can be characterized as pre-emergent, post-emergent, selective, and non-selective. A pre-emergent herbicide is one that generally controls ungerminated seeds by inhibiting germination. Post-emergent herbicides are generally lethal to emerged plants. A few herbicides have both pre- and post-emergent activity. Herbicides can be selective or non-selective. If an herbicide is selective, it will affect some species of plants and not others, e.g., monocots (grasses) vs. dicots (broadleaf plants). A non-selective herbicide is one that is lethal to any plant species to which it is applied.

Herbicides kill plants through contact or systemic action. Contact herbicides are most effective against annual weeds and kill only the plant parts to which the chemical is applied. Systemic herbicides are absorbed either by roots or foliar parts of a plant and are then translocated within the plant. Although systemic herbicides can be effective against annual and perennial weeds, they are particularly effective against established perennial weeds.

Pre-emergent herbicides inhibit germination of annuals from seed, but generally do not control perennial plants that germinate from bulbs, corms, rhizomes, stolons, or other vegetative structures. Common pre-emergent herbicide classes include the following:

- Dinitroaniline Type: Examples of this class are pendimethalin (Weedgrass™), trifluralin (Treflan™), benefin (Balan™), and combinations of these. These herbicides provide for pre-emergence control of annual grasses and other annuals. Some of these herbicides should not be applied in temperatures above 90 degrees Fahrenheit (°F). All of these herbicides need to be watered into the soil for proper activation. Some persist for several months.
- Dithiopyr (Dimension™) is a selective herbicide primarily used for pre-emergence annual grass control in established turfgrass. However, it can be used for post-

emergence control of young grass seedlings. Dithiopyr breaks down in soil due to chemical and microbial degradation.

- The most commonly used post-emergent, non-selective herbicides are in a group called glyphosates. Glyphosate (e.g., Rodeo™, Roundup™, and Accord™) is a non-selective, systemic herbicide that is effective on many annual and perennial plants. Glyphosate is most effective if the entire plant is covered. Glyphosate should not be applied when the temperature exceeds 90°F. Glyphosate has a relatively low degree of oral and dermal acute toxicity (EPA 1993). It is considered to be immobile in soil and readily degrades by soil microbes. Glyphosate is minimally toxic to birds, fish, aquatic invertebrates, and honeybees (EPA 1993).

5.5.2.3. APPLICATION AND HANDLING

It is the responsibility of the herbicide user to observe all directions, restrictions, and precautions on herbicide labels. Store all herbicides in original containers with labels intact and behind locked doors. Keep herbicides out of the reach of children. The following general precautions will be implemented for herbicide application:

- Use herbicides at correct label dosage and intervals to avoid illegal residues or injury to plants and animals.
- Use herbicides carefully to avoid drift or contamination of non-target areas.
- Surplus herbicides and containers should be disposed of in accordance with label instructions to prevent contamination of water and other hazards.
- Follow directions on the herbicide label regarding restrictions as required by state or federal laws and regulations.
- Avoid any action that may threaten a rare, threatened, or endangered species or its habitat.

5.5.2.4. LIMITATIONS

Herbicide applications must follow EPA label instructions. Application of herbicides will be suspended when any of the following conditions exists:

- Wind velocity exceeds 6 miles per hour (mph) during application of liquids or 15 mph during application of granular herbicides.
- Snow or ice covers the foliage of noxious weeds.
- Precipitation is occurring or is imminent.
- Air temperatures exceed 90°F.

5.5.2.5. TRANSPORT AND MIXING

During the construction phase, herbicides will be transported within the project site with the following provisions:

- Only the quantity needed for that day's work will be transported on-site.
- Concentrate will be transported in approved containers only and in a manner that will prevent tipping or spilling, and in a location that is isolated from the vehicle's driving compartment, food, clothing, and safety equipment.
- Mixing will occur over a drip-catching device, and at a distance greater than 200 feet from open or flowing water, wetlands, or other sensitive resources. No herbicides will be applied at these areas unless authorized by appropriate regulatory agencies.
- Herbicide equipment and containers will be inspected for leaks daily. Disposal of spent containers will be in accordance with the herbicide label.
- During the operations phase of the project, herbicides will be stored only in cabinets of approved design and will be under lock and key.

5.5.2.6. SPRAY METHODS

Vehicle-mounted sprayers (e.g., handgun, boom, and injector) will be used mainly in open areas that are readily accessible by vehicle. Hand application methods (e.g., backpack spraying) that target individual plants will be used to treat small or scattered weed populations in rough terrain. Calibration checks of equipment will be conducted at the beginning of spraying and periodically throughout treatment to ensure that proper application rates are achieved.

5.5.2.7. HERBICIDE SPILLS AND CLEANUP

Reasonable precautions will be taken to avoid herbicide spills. In the event of a spill, immediate cleanup will be implemented. Contractors will keep spill kits in their vehicles and in herbicide storage areas to allow for quick and effective response to spills. The following items are to be included in the spill kit:

- protective clothing and gloves
- absorptive clay, "kitty litter," or other commercial adsorbent
- plastic bags and bucket
- shovel
- fiber brush and screw-in handle

- dust pan
- caution tape
- highway flares (use on established roads only)
- detergent

Response to herbicide spills will vary with the size and location of the spill, but general procedures include the following:

- traffic control
- dressing the cleanup team in protective clothing
- stopping the leaks
- containing the spilled material
- cleaning up and removing the spilled herbicide or contaminated adsorptive material and soil
- transporting the spilled herbicide and contaminated material to an authorized disposal site

5.5.2.8. HERBICIDE APPLICATION METHODS BY VEGETATION TYPE

Controlling Post-emergent herbaceous vegetation

To control herbaceous weedy vegetation, implement as follows:

- Apply a foliar application of Round-up™ or Rodeo™ on each plant at a minimum rate of 2.5 percent (plus 2 percent by volume [V/V] of nonionic surfactant). Apply Round-up™ in upland areas. Apply Rodeo™ in areas that are in immediate contact with wetlands and/or other water bodies. The ECM will determine the appropriate herbicide to use at each location.
- Provide applications on a spray-to-wet basis with coverage uniform and complete.
- Avoid contact with established native shrub and grass species.
- Temporarily discontinue work in the event of gusty winds or winds in excess of 6 mph.
- Temporarily discontinue in the event of rainfall.
- Ensure applicators possess current pest control licenses valid in the State of California and wear gloves, masks, and long sleeves as protection from chemical injuries.

- Leave sprayed vegetation undisturbed for 7 days until visible effects of herbicide application are present such as wilted and brown foliage.
- If any seed reached maturity, remove all treated plant materials by placing all noxious weed material potentially containing propagules in durable bags. Bags shall be sealed prior to transport. Noxious weed material shall be disposed of by incineration or covered transport to an appropriate landfill.

Controlling Post-emergent Woody Vegetation

Woody vegetation should be controlled using cut and paint method of removal. To control woody vegetation, implement as follows:

- Cut sprouts or woody stems to a height of 12 inches or less above ground and remove all aboveground debris for disposal at a suitable landfill.
- Apply Round-Up™ or Rodeo™ at a 100 percent rate to the cut sprouts or stems within 2 minutes of cutting. Use Round-up™ in upland areas. Use Rodeo™ in areas that are in immediate contact with wetlands and/or other water bodies. The ECM will determine the appropriate herbicide to use at each location.
- Cover all loads with a tarpaulin to transport vegetation trimmings.
- Apply follow-up foliar applications as described in the previous section to stem regrowth that occurs after initial control effort.
- Continue monitoring cut stems for as long as necessary to ensure complete mortality.

Controlling vegetation with Pre-emergent herbicides

Pre-emergent herbicides work only on vegetation reproducing from seed, and are not effective on other types of propagules, such as resprouts from root crowns which have been cut, rhizomes, or other material. The following situations may require the use of pre-emergent herbicides:

- Areas that have repeated weed problems with annual plants, with evidence of a robust weed seed crop in the seed bank, will be sprayed with pre-emergent herbicides during appropriate pre-germination periods.
- Areas beneath the heliostat arrays, because they will receive overflow of wash water, can be particularly vulnerable to weed infestations.
- Areas around the plant facilities where vegetation is not planted, could benefit from pre-emergent treatments if weed problems persist.

Pre-emergent herbicides are not appropriate for revegetation areas or other native habitats because the germination and growth of desirable native plant seeds could be inhibited.

5.5.3. Competitive Vegetation

Native plant communities have the potential to exclude weed invasion, and over time reduce the level of weed control needed. While full recovery may take decades, early successional communities can be established on-site within one to a few years. Native plants can out-compete noxious weeds thereby accelerating recovery and reducing the habitat available for weedy species to become established. The establishment of native vegetation is an effective, long-term weed control strategy and is incorporated in this Plan. The RSEP Revegetation and Rehabilitation Plan component of the BRMIMP has been prepared to implement this strategy.

BLM recommends allowing for passive (natural recovery) revegetation over active (seeding/planting) when appropriate (USDI 2007; Appendix A). Planting or seeding should be used only if necessary to prevent unacceptable erosion or to resist competition from non-native invasive species.

The project site provides an example of successful, passive revegetation because numerous native species have colonized the site in the years after the Rice Airfield was abandoned. For example, currently, there are numerous mature creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) shrubs, as well as other native shrubs and herbaceous species that have colonized all on-site areas including the previously paved runways and taxiways.

5.5.4. Unacceptable Weed Removal Methods

Tilling

Tilling, or the turning over of soil, is inappropriate in arid environments and will not be used. In desert landscapes, tilled weeds can set seed even after burial. Tilling could also reduce the abundance of native species and disrupt the natural structure and chemistry of the soil, providing opportunities for noxious weed colonization.

Mowing

Mowing is sometimes used to reduce weed cover and thatch late in the growing season, typically after annuals have matured. Mowing does not remove weeds; it merely cuts back the thatch that develops during the growing season. Mowing is sometimes used as a fire control method, but typically results in proliferation of weed seed and an increased density of noxious weeds. Although mowing may reduce apparent noxious weed abundance, mowed plants may resprout and mowing spreads noxious weed seeds.

Chapter 6. Reporting Requirements

6.1. Report Content

Implementation of the noxious weed management plan will include the following data collection and reporting requirements.

6.1.1. Construction Monitoring Reports

During the construction phase, which could last for 24 to 30 months, the ECM will be responsible for preparing monthly noxious weed management construction reports. The monthly noxious weed management construction reports will be submitted to CEC Compliance Project Manager (CPM). Construction weed monitoring reports will include the following information:

- The location, type, extent, and density of noxious weeds. Data will include maps and photographs as well as text and tabular data.
- Management efforts, including date, location, type of treatment implemented, and results. Ongoing evaluation of success of treatment will be included.
- Information on implementation and success of preventative measures, including status of equipment wash facilities and a list of workers that have completed the worker environmental training program.

6.1.2. Long-term Monitoring Reports

Annual monitoring reports will be produced for the life of the project (30 years). Long-term monitoring reports will include the following information:

- The location, type, extent, and density of noxious weeds. Data will include maps and photographs.
- Management efforts and recommendations, including date of efforts, location, types of treatment implemented, and results. Ongoing evaluation of success of treatment will be included.
- The reports will also include a complete description of restoration efforts and status at meeting performance criteria.

6.2. Reporting Periods

6.2.1. Construction Monitoring Reports

During the construction phase, which could last for 24 to 30 months, the ECM will be responsible for preparing monthly noxious weed management construction reports. The monthly noxious weed management construction reports will be submitted to CEC CPM. After the project has been constructed a post-construction report summarizing the overall results of noxious weed management activities will be submitted to CEC CPM.

6.2.2. Long-term Monitoring Reports

Annual monitoring reports will be produced for the life of the project (30 years). The site surveys conducted to support this are described as follows:

- Quarterly surveys of the laydown area revegetation site will be conducted for the first year after installation. The data and results of these surveys will be compiled into the first year annual report, which will include information on noxious weed management activities during that year.
- Biannual visits will be implemented thereafter. Results of biannual visit will be summarized and reported in the annual reports.
- At the end of the monitoring period, final monitoring report summarizing the overall results of noxious weed management activities will be submitted to CEC.

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Appendix A BLM Herbicide Treatment Standard Operating Procedures

(Appendix B of the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement)

APPENDIX B

HERBICIDE TREATMENT STANDARD OPERATING PROCEDURES

This section identifies standard operating procedures (SOPs) that will be followed by the U.S. Department of the Interior Bureau of Land Management (USDI BLM) under all alternatives to ensure that risks to human health and the environment from herbicide treatment actions will be kept to a minimum. Standard operating procedures are the management controls and performance standards required for vegetation management treatments. These practices are intended to protect and enhance natural resources that could be affected by future vegetation treatments.

Prevention of Weeds and Early Detection and Rapid Response

Once weed populations become established, infestations can increase and expand in size. Weeds colonize highly disturbed ground and invade plant communities that have been degraded, but are also capable of invading intact communities. Therefore, prevention, early detection, and rapid response are the most cost-effective methods of weed control. Prevention, early detection, and rapid response strategies that reduce the need for vegetative treatments for noxious weeds should lead to a reduction in the number of acres treated using herbicides in the future by reducing or preventing weed establishment.

As stated in the BLM's *Partners Against Weeds: An Action Plan for the BLM*, prevention and public education are the highest priority weed management activities. Priorities are as follows:

- Priority 1: Take actions to prevent or minimize the need for vegetation control when and where feasible, considering the management objectives of the site.
- Priority 2: Use effective nonchemical methods of vegetation control when and where feasible.
- Priority 3: Use herbicides after considering the effectiveness of all potential methods or in combination with other methods or controls.

Prevention is best accomplished by ensuring the seeds and vegetatively reproductive plant parts of new weed species are not introduced into new areas.

The BLM is required to develop a noxious weed risk assessment when it is determined that an action may introduce or spread noxious weeds or when known habitat exists. If the risk is moderate or high, the BLM may modify the project to reduce the likelihood of weeds infesting the site, and to identify control measures to be implemented if weeds do infest the site.

To prevent the spread of weeds, the BLM takes actions to minimize the amount of existing non-target vegetation that is disturbed or destroyed during project or vegetation treatment actions (Table B-1). During project planning, the following steps are taken:

- Incorporate measures to prevent introduction or spread of weeds into project layout, design, alternative evaluation, and project decisions.
- During environmental analysis for projects and maintenance programs, assess weed risks, analyze potential treatment of high-risk sites for weed establishment and spread, and identify prevention practices.
- Determine prevention and maintenance needs, to include the use of herbicides if needed, at the onset of project planning.
- Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.

During project development, weed infestations are prioritized for treatment in project operating areas and along access routes. Weeds present on or near the site are identified, a risk assessment is completed, and weeds are controlled as necessary. Project staging areas are weed free, and travel through weed infested areas is avoided or minimized. Examples of prevention actions to be followed during project activities include cleaning all equipment and clothing before entering the project site; avoiding soil disturbance and the creation of other

soil conditions that promote weed germination and establishment; and using weed-free seed, hay, mulch, gravel, soil, and mineral materials on public lands where there is a state or county program in place.

Conditions that enhance invasive species abundance should be addressed when developing mitigation and prevention plans for activities on public lands. These conditions include excessive disturbance associated with road maintenance, poor grazing management, and high levels of recreational use. If livestock grazing is managed to maintain the vigor of native perennial plants, particularly grasses, the chance of weeds invading rangeland is much less. By carefully managing recreational use and educating the public on the potential impacts of recreational activities on vegetation, the amount of damage to native vegetation and soil can be minimized at high use areas, such as campgrounds and off-highway vehicle (OHV) trails. Early detection in recreation areas is focused on roads and trails, where much of the weed spread occurs.

The BLM participates in the National Early Warning and Rapid Response System for Invasive Plants (Figure B-1). The goal of this System to minimize the establishment and spread of new invasive species through a coordinated framework of public and private processes by:

- Early detection and reporting of suspected new plant species to appropriate officials;
- Identification and vouchering of submitted specimens by designated specialists;
- Verification of suspected new state, regional, and national plant records;
- Archival of new records in designated regional and plant databases;
- Rapid assessment of confirmed new records; and
- Rapid response to verified new infestations that are determined to be invasive.

Herbicide Treatment Planning

BLM Manual 9011 (*Chemical Pest Control*) outlines the policies, and BLM Handbook H-9011-1 (*Chemical Pest Control*) outlines the procedures, for use of herbicides on public lands. As part of policy, the BLM is required to thoroughly evaluate the need for chemical treatments and their potential for impact on the environment. The BLM is required to use only U.S. Environmental Protection Agency (USEPA)-registered herbicides that have been properly evaluated under National Environmental Policy Act (NEPA), and to carefully follow label directions and additional BLM requirements.

An operational plan is developed and updated for each herbicide project. The plan includes information on project specifications, key personnel responsibilities, and communication, safety, spill response, and emergency procedures. For application of herbicides not approved for aquatic use, the plan should also specify minimum buffer widths between treatment areas and water bodies. Recommended widths are provided in BLM Handbook H-9011-1 (*Chemical Pest Control*), but actual buffers are site and herbicide active ingredient specific, and are determined based on a scientific analysis of environmental factors, such as climate, topography, vegetation, and weather; timing and method of application; and herbicide risks to humans and non-target species. Table B-2 summarizes important SOPs that should be used when applying herbicides to help protect resources of concern on public lands.

Revegetation

Disturbed areas may be reseeded or planted with desirable vegetation when the native plant community cannot recover and occupy the site sufficiently.

Determining the need for revegetation is an integral part of developing a vegetation treatment. The most important component of the process is determining whether active (seeding/planting) or passive (natural recovery) revegetation is appropriate.

U.S. Department of the Interior policy states, “Natural recovery by native plant species is preferable to planting or seeding, either of natives or non-natives. However, planting or seeding should be used only if necessary to prevent unacceptable erosion or resist competition from non-native invasive species” (620 Departmental Memorandum 3 2004). This policy is reiterated in the USDI *Burned Area Emergency Stabilization and Rehabilitation* Manual, the BLM *Burned Area Emergency Stabilization and Rehabilitation* Manual (BLM H-1742-1), and the *Interagency Burned Area Rehabilitation Guidebook*.

TABLE B-1
Prevention Measures

BLM Activity	Prevention Measure
Project Planning	• Incorporate prevention measures into project layout and design, alternative evaluation, and project decisions to prevent the introduction or spread of weeds. • Determine prevention and maintenance needs, including the use of herbicides, at the onset of project planning. • Before ground-disturbing activities begin, inventory weed infestations and prioritize areas for treatment in project operating areas and along access routes. • Remove sources of weed seed and propagules to prevent the spread of existing weeds and new weed infestations. • Pre-treat high-risk sites for weed establishment and spread before implementing projects. • Post weed awareness messages and prevention practices at strategic locations such as trailheads, roads, boat launches, and public land kiosks. • Coordinate project activities with nearby herbicide applications to maximize the cost-effectiveness of weed treatments.
Project Development	• Minimize soil disturbance to the extent practical, consistent with project objectives. • Avoid creating soil conditions that promote weed germination and establishment. • To prevent weed germination and establishment, retain native vegetation in and around project activity areas and keep soil disturbance to a minimum, consistent with project objectives. • Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas, or restrict travel to periods when the spread of seeds or propagules is least likely. • Prevent the introduction and spread of weeds caused by moving weed-infested sand, gravel, borrow, and fill material. • Inspect material sources on site, and ensure that they are weed-free before use and transport. Treat weed-infested sources to eradicate weed seed and plant parts, and strip and stockpile contaminated material before any use of pit material. • Survey the area where material from treated weed-infested sources is used for at least 3 years after project completion to ensure that any weeds transported to the site are promptly detected and controlled. • Prevent weed establishment by not driving through weed-infested areas. • Inspect and document weed establishment at access roads, cleaning sites, and all disturbed areas; control infestations to prevent weed spread within the project area. • Avoid acquiring water for dust abatement where access to the water is through weed-infested sites. • Identify sites where equipment can be cleaned. Clean equipment before entering public lands. • Clean all equipment before leaving the project site if operating in areas infested with weeds. • Inspect and treat weeds that establish at equipment cleaning sites. • Ensure that rental equipment is free of weed seed. • Inspect, remove, and properly dispose of weed seed and plant parts found on workers' clothing and equipment. Proper disposal entails bagging the seeds and plant parts and incinerating them.
Revegetation	• Include weed prevention measures, including project inspection and documentation, in operation and reclamation plans. • Retain bonds until reclamation requirements, including weed treatments, are completed, based on inspection and documentation. • To prevent conditions favoring weed establishment, reestablish vegetation on bare ground caused by project disturbance as soon as possible using either natural recovery or artificial techniques. • Maintain stockpiled, uninfested material in a weed-free condition.

TABLE B-1 (Cont.)
Prevention Measures

BLM Activity	Prevention Measure
Revegetation (Cont.)	• Revegetate disturbed soil (except travel ways on surfaced projects) in a manner that optimizes plant establishment for each specific project site. For each project, define what constitutes disturbed soil and objectives for plant cover revegetation. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary. • Where practical, stockpile weed-seed-free topsoil and replace it on disturbed areas (e.g., road embankments or landings). • Inspect seed and straw mulch to be used for site rehabilitation (for wattles, straw bales, dams, etc.) and certify that they are free of weed seed and propagules. • Inspect and document all limited term ground-disturbing operations in noxious weed infested areas for at least 3 growing seasons following completion of the project. • Use native material where appropriate and feasible. Use certified weed-free or weed-seed-free hay or straw where certified materials are required and/or are reasonably available. • Provide briefings that identify operational practices to reduce weed spread (for example, avoiding known weed infestation areas when locating fire lines). • Evaluate options, including closure, to regulate the flow of traffic on sites where desired vegetation needs to be established. Sites could include road and trail rights-of-way (ROW), and other areas of disturbed soils.

In addition to these handbooks and policy, use of native and non-native seed in revegetation and restoration is guided by BLM Manual 1745 (*Introduction, Transplant, Augmentation and Reestablishment of Fish, Wildlife and Plants)*. This manual states that native species shall be used, unless it is determined through the NEPA process that: 1) suitable native species are not available; 2) the natural biological diversity of the proposed management area will not be diminished; 3) exotic and naturalized species can be confined within the proposed management area; 4) analysis of ecological site inventory information indicates that a site will not support reestablishment of a species that historically was part of the natural environment; or 5) resource management objectives cannot be met with native species.

When natural recovery is not feasible, revegetation can be used to stabilize and restore vegetation on disturbed sites and to eliminate or reduce the conditions that favor invasive species. Reseeding or replanting may be required when there is insufficient vegetation or seed stores to naturally revegetate the site.

To ensure revegetation success, there must be adequate soil for root development and moisture storage, which provides moisture to support the new plants. Chances for revegetation success are improved by selecting seed with high purity and percentage germination; selecting native species or cultivars adapted to the area; planting at proper depth, seeding rate, and time of the year for the region; choosing the appropriate planting method; and, where feasible, removing competing vegetation. Planting mixtures are adapted for the treatment area and site uses. A combination of forbs, perennial grasses, and shrubs is typically used on rangeland sites, while shrubs and trees might be favored for riparian and forestland sites. A mixture of several native plant species and types or functional groups enhances the value of the site for fish and wildlife and improves the health and aesthetic character of the site. Mixtures can better take advantage of variable soil, terrain, and climatic conditions, and thus are more likely to withstand insect infestations and survive adverse climatic conditions.

The USDI BLM Native Seed program was developed in response to Congressional direction to supply native plant material for emergency stabilization and longer-term rehabilitation and restoration efforts. The focus of the program is to increase the number of native plant species for which seed is available and the total amount of native seed available for these efforts. To date, the program has focused on native plant material needs of emergency stabilization and burned area rehabilitation in the Great Basin, but is expanding to focus on areas such as western Oregon, the Colorado Plateau, and most recently the Mojave Desert. The Wildland Fire Management Program funds and manages the effort.

The National Seed Warehouse is a storage facility for the native seed supply. Through a Memorandum of

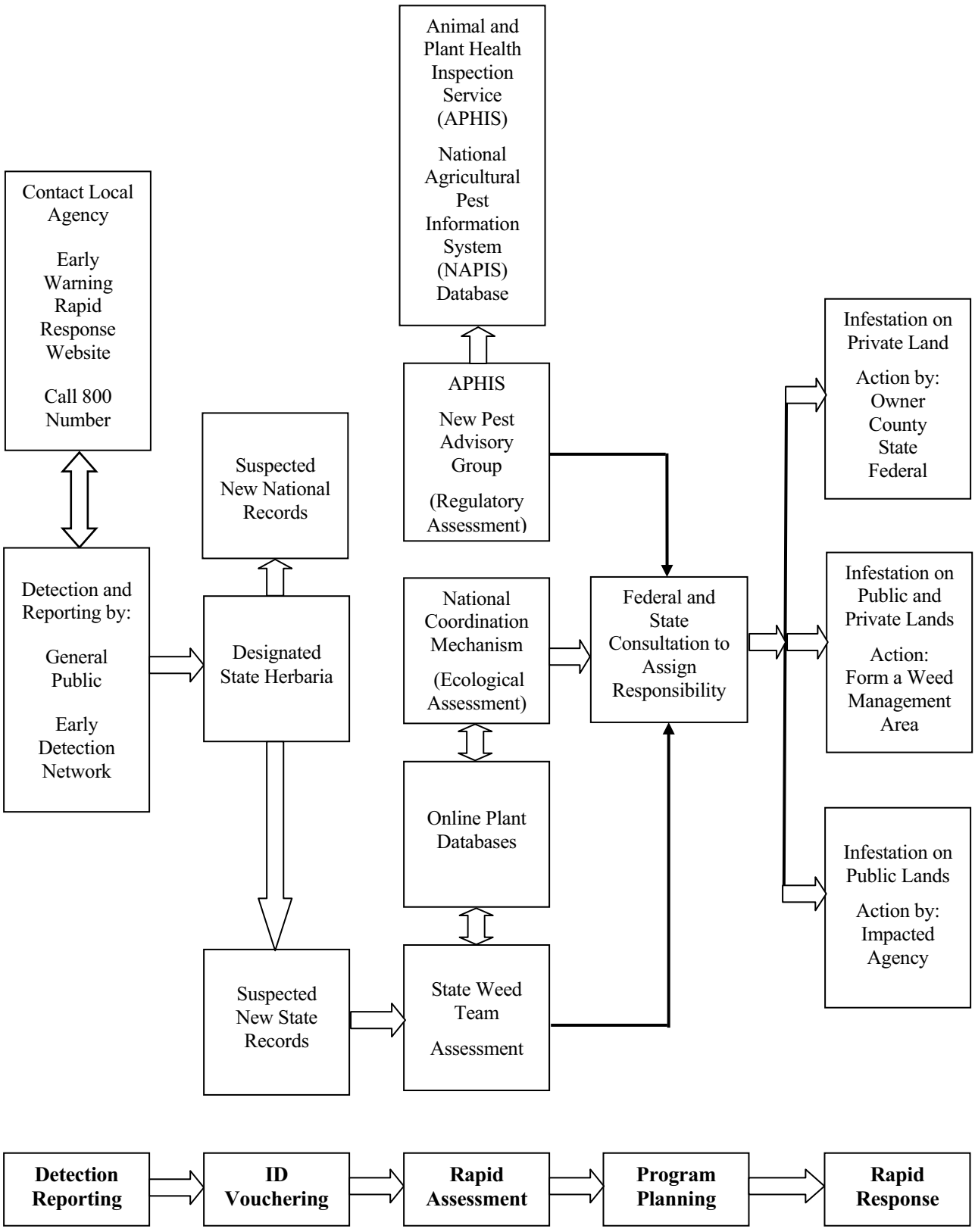

Figure B-1. National Early Warning and Rapid Response System for Invasive Plants.

Understanding with the BLM Idaho State Director, each state (Idaho, Oregon, Nevada, Utah and Colorado) can reserve an annual seed supply for purchase based on a reasonable projection of annual acreage to be stabilized or rehabilitated over a 5-year period.

The Great Basin Restoration Initiative (GBRI) grew out of concern for the health of the Great Basin after the wildfires of 1999. The goal of GBRI is to implement treatments and strategies to maintain functioning ecosystems and to proactively restore degraded ones at strategic locations. Native plants are emphasized in restoration projects where their use is practical and the potential for success is satisfactory. Monitoring is recommended to measure treatment success. To increase the availability of native plants, especially native forbs, the GBRI has established a collaborative native plant project, the Great Basin Native Plant Selection and Increase Project, to increase native plant availability and the technology to successfully establish these plants. This project is supported by funding from the BLM's Native Plant Initiative.

The BLM will follow the following SOPs when revegetating sites:

- Cultivate previously disturbed sites to reduce the amount of weed seeds in the soil seedbank.
- Revegetate sites once work is completed or soon after a disturbance.
- When available, use native seed of known origin as labeled by state seed certification programs.
- Use seed of non-native cultivars and species only when locally adapted native seed is not available or when it is unlikely to establish quickly enough to prevent soil erosion or weed establishment.
- Use seed that is free of noxious and invasive weeds, as determined and documented by a seed inspection test by a certified seed laboratory.
- Limit nitrogen fertilizer applications that favor annual grass growth over forb growth in newly seeded areas, especially where downy brome (cheatgrass) and other invasive annuals are establishing.
- Use clean equipment, free of plants and plant parts, on revegetation projects to prevent the inadvertent introduction of weeds into the site.
- Where important pollinator resources exist, include native nectar and pollen producing plants in the seed mixes used in restoration and reclamation projects. Include non-forage plant species in seed mixes for their pollinator/host relationships as foraging, nesting, or shelter species. Choose native plant species over manipulated cultivars, especially of forbs and shrubs, since natives tend to have more valuable pollen and nectar resources than cultivars. Ensure that bloom times for the flowers of the species chosen match the activity times for the pollinators. Maintain sufficient litter on the soil surfaces of native plant communities for ground-nesting bees.
- Where feasible, avoid grazing by domestic and wild animals on treatment sites until vegetation is well established. Where total rest from grazing is not feasible, efforts should be made to modify the amount and/or season of grazing to promote vegetation recovery within the treatment area. Reductions in grazing animal numbers, permanent or temporary fencing, changes in grazing rotation, and identification of alternative forage sources are examples of methods that could be used to remove, reduce or modify grazing impacts during vegetation recovery.

Special Precautions

Special Status Species

Federal policies and procedures for protecting federally-listed threatened and endangered plant and animal species, and species proposed for listing, were established by the Endangered Species Act of 1973 and regulations issued pursuant to the Act. The purposes of the Act are to provide mechanisms for the conservation of threatened and endangered species and their habitats. Under the Act, the Secretary of the Interior is required to determine which species are threatened or endangered and to issue recovery plans for those species.

Section 7 of the Act specifically requires all federal agencies to use their authorities in furtherance of the Act to carry out programs for the conservation of listed

species, and to ensure that no agency action is likely to jeopardize the continued existence of a listed species or adversely modify critical habitat. Policy and guidance (BLM Manual 6840; *Special Status Species*) also stipulates that species proposed for listing must be managed at the same level of protection as listed species.

The BLM state directors may designate special status in cooperation with their respective state. These special status species must receive, at a minimum, the same level of protection as federal candidate species. The BLM will also carry out management for the conservation of state-listed species, and state laws protecting these species will apply to all BLM programs and actions to the extent that they are consistent with Federal Land Policy and Management Act (FLPMA) and other federal laws.

The BLM consulted with the U.S. Fish and Wildlife Service (UFWS) and National Marine Fisheries Service (NMFS) during development of the *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS) as required under Section 7 of the Endangered Species Act. As part of this process, the BLM prepared a formal consultation package that included a description of the program; species listed as threatened or endangered, species proposed for listing, and critical habitats that could be affected by the program; and a Biological Assessment (BA) that evaluated the likely impacts to listed species, species proposed for listing, and critical habitats from the proposed vegetation treatment program. Over 300 species were evaluated in the BA. The BA also provides broad guidance at a programmatic level for actions that will be taken by the BLM to avoid adversely impacting species or critical habitat.

Before any vegetation treatment or ground disturbance occurs, BLM policy requires a survey of the project site for species listed or proposed for listing, or special status species. This is done by a qualified biologist and/or botanist who consults the state and local databases and visits the site at the appropriate season. If a proposed project may affect a proposed or listed species or its critical habitat, the BLM consults with the USFWS and/or NMFS. A project with a "may affect, likely to adversely affect" determination requires formal consultation and receives a Biological Opinion from the USFWS and/or NMFS. A project with a "may affect, not likely to adversely affect" determination requires informal consultation and receives a concurrence letter from USFWS and/or NMFS, unless that action is implemented under the authorities of the alternative consultation agreement pursuant to counterpart regulations established for *National Fire Plan* projects.

Wilderness Areas

Wilderness areas, which are designated by Congress, are defined by the Wilderness Act of 1964 as places "where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." The BLM manages 175 Wilderness Areas encompassing over 7.2 million acres.

Activities allowed in wilderness areas are identified in wilderness management plans prepared by the BLM. The BLM does not ordinarily treat vegetation in wilderness areas, but will control invasive and noxious weeds when they threaten lands outside wilderness area or are spreading within the wilderness and can be controlled without serious adverse impacts to wilderness values.

Management of vegetation in a wilderness area is directed toward retaining the natural character of the environment. Tree and shrub removal is usually not allowed, except for fire, insect, or disease control. Reforestation is generally prohibited except to repair damage caused by humans in areas where natural reforestation is unlikely. Only native species and primitive methods, such as hand planting, are allowed for reforestation.

Tools and equipment may be used for vegetation management when they are the minimum amount necessary for the protection of the wilderness resource. Motorized tools may only be used in special or emergency cases involving the health and safety of wilderness visitors, or the protection of wilderness values.

Habitat manipulation using mechanical or chemical means may be allowed to protect threatened and endangered species and to correct unnatural conditions, such as weed infestations, resulting from human influence.

The BLM also manages a total of 610 Wilderness Study Areas (WSAs) encompassing nearly 14.3 million acres. These are areas that have been determined to have wilderness characteristics worthy of consideration for wilderness designation. The BLM's primary goals in WSAs are to manage them so as to not impair their wilderness values and to maintain their suitability for

preservation as wilderness until Congress makes a determination on their future.

In WSAs, the BLM must foster a natural distribution of native species of plants and animals by ensuring that ecosystems and processes continue to function naturally.

Cultural Resources

The effects of BLM actions on cultural resources are addressed through compliance with the National Historic Preservation Act, as implemented through a national Programmatic Agreement (*Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act*) and state-specific protocol agreements with State Historic Preservation Officers (SHPOs). The BLM's responsibilities under these authorities are addressed as early in the vegetation management project planning process as possible.

The BLM meets its responsibilities for consultation and government-to-government relationships with Native American tribes by consulting with appropriate tribal representatives prior to taking actions that affect tribal interests. The BLM's tribal consultation policies are detailed in BLM Manual 8120 (*Tribal Consultation Under Cultural Resource Authorities)* and Handbook H-8120-1 (*Guidelines for Conducting Tribal Consultation).* The BLM consulted with Native American tribes and Alaska Native groups during development of the PEIS. Information gathered on important tribal resources and potential impacts to these resources from herbicide treatments is presented in the analysis of impacts.

When conducting vegetation treatments, field office personnel consult with relevant parties (including tribes, native groups, and SHPOs), assess the potential of the proposed treatment to affect cultural and subsistence resources, and devise inventory and protection strategies suitable to the types of resources present and the potential impacts to them.

Herbicide treatments, for example, are unlikely to affect buried cultural resources, but might have a negative effect on traditional cultural properties comprised of plant foods or materials significant to local tribes and native groups. These treatments require inventory and protection strategies that reflect the different potential of each treatment to affect various types of cultural resources.

Impacts to significant cultural resources are avoided through project redesign or are mitigated through data recovery, recordation, monitoring, or other appropriate measures. When cultural resources are discovered during vegetation treatment, appropriate actions are taken to protect these resources.

TABLE B-2
Standard Operating Procedures for Applying Herbicides

Resource Element	Standard Operating Procedure
Guidance Documents	BLM Handbook H-9011-1 (*Chemical Pest Control*); and manuals 1112 (*Safety*), 9011 (*Chemical Pest Control*), 9012 (*Expenditure of Rangeland Insect Pest Control Funds*), 9015 (*Integrated Weed Management)*, and 9220 (*Integrated Pest Management*).
General	• Prepare operational and spill contingency plan in advance of treatment. • Conduct a pretreatment survey before applying herbicides. • Select herbicide that is least damaging to the environment while providing the desired results. • Select herbicide products carefully to minimize additional impacts from degradates, adjuvants, inert ingredients, and tank mixtures. • Apply the least amount of herbicide needed to achieve the desired result. • Follow herbicide product label for use and storage. • Have licensed applicators apply herbicides. • Use only USEPA-approved herbicides and follow product label directions and "advisory" statements. • Review, understand, and conform to the "Environmental Hazards" section on the herbicide product label. This section warns of known pesticide risks to the environment and provides practical ways to avoid harm to organisms or to the environment. • Consider surrounding land use before assigning aerial spraying as a treatment method and avoid aerial spraying near agricultural or densely populated areas. • Minimize the size of application area, when feasible. • Comply with herbicide-free buffer zones to ensure that drift will not affect crops or nearby residents/landowners. • Post treated areas and specify reentry or rest times, if appropriate. • Notify adjacent landowners prior to treatment. • Keep a copy of Material Safety Data Sheets (MSDSs) at work sites. MSDSs are available for review at http://www.cdms.net/. • Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location. • Avoid accidental direct spray and spill conditions to minimize risks to resources. • Consider surrounding land uses before aerial spraying. • Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence). • Make helicopter applications at a target airspeed of 40 to 50 miles per hour (mph), and at about 30 to 45 feet above ground. • Take precautions to minimize drift by not applying herbicides when winds exceed >10 mph (>6 mph for aerial applications), or a serious rainfall event is imminent. • Use drift control agents and low volatile formulations. • Conduct pre-treatment surveys for sensitive habitat and special status species within or adjacent to proposed treatment areas. • Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation. • Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species. • Turn off applied treatments at the completion of spray runs and during turns to start another spray run. • Refer to the herbicide product label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Clean OHVs to remove seeds.

TABLE B-2 (Cont.)
Standard Operating Procedures for Applying Pesticides

Resource Element	Standard Operating Procedure
Air Quality See Manual 7000 (*Soil, Water, and Air Management*)	• Consider the effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks. • Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph (>6 mph for aerial applications) or rainfall is imminent. • Use drift reduction agents, as appropriate, to reduce the drift hazard. • Select proper application equipment (e.g., spray equipment that produces 200- to 800-micron diameter droplets [spray droplets of 100 microns and less are most prone to drift]). • Select proper application methods (e.g., set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources).
Soil See Manual 7000 (*Soil, Water, and Air Management*)	• Minimize treatments in areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected. • Minimize use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility. • Do not apply granular herbicides on slopes of more than 15% where there is the possibility of runoff carrying the granules into non-target areas.
Water Resources See Manual 7000 (*Soil, Water, and Air Management*)	• Consider climate, soil type, slope, and vegetation type when developing herbicide treatment programs. • Select herbicide products to minimize impacts to water. This is especially important for application scenarios that involve risk from active ingredients in a particular herbicide, as predicted by risk assessments. • Use local historical weather data to choose the month of treatment. Considering the phenology of the target species, schedule treatments based on the condition of the water body and existing water quality conditions. • Plan to treat between weather fronts (calms) and at appropriate time of day to avoid high winds that increase water movements, and to avoid potential stormwater runoff and water turbidity. • Review hydrogeologic maps of proposed treatment areas. Note depths to groundwater and areas of shallow groundwater and areas of surface water and groundwater interaction. Minimize treating areas with high risk for groundwater contamination. • Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body. • Do not rinse spray tanks in or near water bodies. Do not broadcast pellets where there is danger of contaminating water supplies. • Maintain buffers between treatment areas and water bodies. Buffer widths should be developed based on herbicide- and site-specific criteria to minimize impacts to water bodies. • Minimize the potential effects to surface water quality and quantity by stabilizing terrestrial areas as quickly as possible following treatment.
Wetlands and Riparian Areas	• Use a selective herbicide and a wick or backpack sprayer. • Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications.
Vegetation See Handbook H-4410-1 (*National Range Handbook*), and manuals 5000 (*Forest Management*) and 9015 (*Integrated Weed Management*)	• Refer to the herbicide label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Use native or sterile species for revegetation and restoration projects to compete with invasive species until desired vegetation establishes. • Use weed-free feed for horses and pack animals. Use weed-free straw and mulch for revegetation and other activities. • Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. Consider adjustments in the existing grazing permit, to maintain desirable vegetation on the treatment site.

TABLE B-2 (Cont.)
Standard Operating Procedures for Applying Pesticides

Resource Element	Standard Operating Procedure
Pollinators	• Complete vegetation treatments seasonally before pollinator foraging plants bloom. • Time vegetation treatments to take place when foraging pollinators are least active both seasonally and daily. • Design vegetation treatment projects so that nectar and pollen sources for important pollinators and resources are treated in patches rather than in one single treatment. • Minimize herbicide application rates. Use typical rather than maximum rates where there are important pollinator resources. • Maintain herbicide free buffer zones around patches of important pollinator nectar and pollen sources. • Maintain herbicide free buffer zones around patches of important pollinator nesting habitat and hibernacula. • Make special note of pollinators that have single host plant species, and minimize herbicide spraying on those plants (if invasive species) and in their habitats.
Fish and Other Aquatic Organisms See manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)	• Use appropriate buffer zones based on label and risk assessment guidance. • Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used, and use spot rather than broadcast or aerial treatments. • Use appropriate application equipment/method near water bodies if the potential for off-site drift exists. • For treatment of aquatic vegetation, 1) treat only that portion of the aquatic system necessary to achieve acceptable vegetation management, 2) use the appropriate application method to minimize the potential for injury to desirable vegetation and aquatic organisms, and 3) follow water use restrictions presented on the herbicide label.
Wildlife See manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)	• Use herbicides of low toxicity to wildlife, where feasible. • Use spot applications or low-boom broadcast operations where possible to limit the probability of contaminating non-target food and water sources, especially non-target vegetation over areas larger than the treatment area. • Use timing restrictions (e.g., do not treat during critical wildlife breeding or staging periods) to minimize impacts to wildlife.
Threatened, Endangered, and Sensitive Species See Manual 6840 (*Special Status Species*)	• Survey for special status species before treating an area. Consider effects to special status species when designing herbicide treatment programs. • Use a selective herbicide and a wick or backpack sprayer to minimize risks to special status plants. • Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration, sensitive life stages) for special status species in area to be treated.
Livestock See Handbook H-4120-1 (*Grazing Management*)	• Whenever possible and whenever needed, schedule treatments when livestock are not present in the treatment area. Design treatments to take advantage of normal livestock grazing rest periods, when possible. • As directed by the herbicide product label, remove livestock from treatment sites prior to herbicide application, where applicable. • Use herbicides of low toxicity to livestock, where feasible. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contamination of non-target food and water sources. • Avoid use of diquat in riparian pasture while pasture is being used by livestock. • Notify permittees of the herbicide treatment project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Notify permittees of livestock grazing, feeding, or slaughter restrictions, if necessary. • Provide alternative forage sites for livestock, if possible.

TABLE B-2 (Cont.)
Standard Operating Procedures for Applying Pesticides

Resource Element	Standard Operating Procedure
Wild Horses and Burros	• Minimize using herbicides in areas grazed by wild horses and burros. • Use herbicides of low toxicity to wild horses and burros, where feasible. • Remove wild horses and burros from identified treatment areas prior to herbicide application, in accordance with herbicide product label directions for livestock. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contaminating non-target food and water sources.
Cultural Resources and Paleontological Resources See handbooks H-8120-1 (*Guidelines for Conducting Tribal Consultation*) and H-8270-1 (*General Procedural Guidance for Paleontological Resource Management*), and manuals 8100 (*The Foundations for Managing Cultural Resources*), 8120 (*Tribal Consultation Under Cultural Resource Authorities*), and 8270 (*Paleontological Resource Management*) See also: *Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act*	• Follow standard procedures for compliance with Section 106 of the National Historic Preservation Act as implemented through the *Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act* and state protocols or 36 Code of Federal Regulations Part 800, including necessary consultations with State Historic Preservation Officers and interested tribes. • Follow BLM Handbook H-8270-1 (*General Procedural Guidance for Paleontological Resource Management*) to determine known Condition I and Condition 2 paleontological areas, or collect information through inventory to establish Condition 1 and Condition 2 areas, determine resource types at risk from the proposed treatment, and develop appropriate measures to minimize or mitigate adverse impacts. • Consult with tribes to locate any areas of vegetation that are of significance to the tribe and that might be affected by herbicide treatments. • Work with tribes to minimize impacts to these resources. • Follow guidance under Human Health and Safety in the PEIS in areas that may be visited by Native peoples after treatments.
Visual Resources See handbooks H-8410-1 (*Visual Resource Inventory*) and H-8431-1 (*Visual Resource Contrast Rating*), and manual 8400 (*Visual Resource Management*)	• Minimize the use of broadcast foliar applications in sensitive watersheds to avoid creating large areas of browned vegetation. • Consider the surrounding land use before assigning aerial spraying as an application method. • Minimize off-site drift and mobility of herbicides (e.g., do not treat when winds exceed 10 mph; minimize treatment in areas where herbicide runoff is likely; establish appropriate buffer widths between treatment areas and residences) to contain visual changes to the intended treatment area. • If the area is a Class I or II visual resource, ensure that the change to the characteristic landscape is low and does not attract attention (Class I), or if seen, does not attract the attention of the casual viewer (Class II). • Lessen visual impacts by: 1) designing projects to blend in with topographic forms; 2) leaving some low-growing trees or planting some low-growing tree seedlings adjacent to the treatment area to screen short-term effects; and 3) revegetating the site following treatment. • When restoring treated areas, design activities to repeat the form, line, color, and texture of the natural landscape character conditions to meet established Visual Resource Management (VRM) objectives.

TABLE B-2 (Cont.)
Standard Operating Procedures for Applying Pesticides

Resource Element	Standard Operating Procedure
Wilderness and Other Special Areas See handbooks H-8550-1 (*Management of Wilderness Study Areas (WSAs)*), and H-8560-1 (*Management of Designated Wilderness Study Areas*), and Manual 8351 (*Wild and Scenic Rivers*)	• Encourage backcountry pack and saddle stock users to feed their livestock only weed-free feed for several days before entering a wilderness area. • Encourage stock users to tie and/or hold stock in such a way as to minimize soil disturbance and loss of native vegetation. • Revegetate disturbed sites with native species if there is no reasonable expectation of natural regeneration. • Provide educational materials at trailheads and other wilderness entry points to educate the public on the need to prevent the spread of weeds. • Use the "minimum tool" to treat noxious and invasive vegetation, relying primarily on the use of ground-based tools, including backpack pumps, hand sprayers, and pumps mounted on pack and saddle stock. • Use chemicals only when they are the minimum method necessary to control weeds that are spreading within the wilderness or threaten lands outside the wilderness. • Give preference to herbicides that have the least impact on non-target species and the wilderness environment. • Implement herbicide treatments during periods of low human use, where feasible. • Address wilderness and special areas in management plans. • Maintain adequate buffers for Wild and Scenic Rivers (¼ mile on either side of river, ½ mile in Alaska).
Recreation See Handbook H-1601-1 (*Land Use Planning Handbook, Appendix C*)	• Schedule treatments to avoid peak recreational use times, while taking into account the optimum management period for the targeted species. • Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas. • Adhere to entry restrictions identified on the herbicide product label for public and worker access. • Post signs noting exclusion areas and the duration of exclusion, if necessary. • Use herbicides during periods of low human use, where feasible.
Social and Economic Values	• Consider surrounding land use before selecting aerial spraying as a method, and avoid aerial spraying near agricultural or densely-populated areas. • Post treated areas and specify reentry or rest times, if appropriate. • Notify grazing permittees of livestock feeding restrictions in treated areas, if necessary, as per herbicide product label instructions. • Notify the public of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Control public access until potential treatment hazards no longer exist, per herbicide product label instructions. • Observe restricted entry intervals specified by the herbicide product label. • Notify local emergency personnel of proposed treatments. • Use spot applications or low-boom broadcast applications where possible to limit the probability of contaminating non-target food and water sources, especially vegetation over areas larger than the treatment area. • Consult with Native American tribes and Alaska Native groups to locate any areas of vegetation that are of significance to the tribes and Native groups and that might be affected by herbicide treatments. • To the degree possible within the law, hire local contractors and workers to assist with herbicide application projects and purchase materials and supplies, including chemicals, for herbicide treatment projects through local suppliers. • To minimize fears based on lack of information, provide public educational information on the need for vegetation treatments and the use of herbicides in an integrated pest management program for projects proposing local use of herbicides.

TABLE B-2 (Cont.)
Standard Operating Procedures for Applying Pesticides

Resource Element	Standard Operating Procedure
Rights-of-way	• Coordinate vegetation management activities where joint or multiple use of a ROW exists. • Notify other public land users within or adjacent to the ROW proposed for treatment. • Use only herbicides that are approved for use in ROW areas.
Human Health and Safety	• Establish a buffer between treatment areas and human residences based on guidance given in the HHRA, with a minimum buffer of ¼ mile for aerial applications and 100 feet for ground applications, unless a written waiver is granted. • Use protective equipment as directed by the herbicide product label. • Post treated areas with appropriate signs at common public access areas. • Observe restricted entry intervals specified by the herbicide product label. • Provide public notification in newspapers or other media where the potential exists for public exposure. • Have a copy of MSDSs at work site. • Notify local emergency personnel of proposed treatments. • Contain and clean up spills and request help as needed. • Secure containers during transport. • Follow label directions for use and storage. • Dispose of unwanted herbicides promptly and correctly.

Appendix B Herbicides Approved for Use on Public Lands in California

Appendix B
Herbicides Approved for Use on Public Lands in California

Active Ingredient	States based on current EIS/ROD & Injunctions	Trade Name	Manufacturer	EPA Registration No.	CA Registration No. *
Bromacil	AZ, **CA,** CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Hyvar X	DuPont	352-287	Y
Bromacil + Diuron	AZ, **CA,** CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Kroval I DF	DuPont	352-505	Y
2,4-D	AZ, **CA,** CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	2,4-D Amine 4	Albaugh, Inc./Agri Star	42750-19	Y
		2,4-D LV 4	Albaugh, Inc./Agri Star	42750-15	Y
		Solve 2,4-D	Albaugh, Inc./Agri Star	42750-22	Y
		Aqua-Kleen	Cerexagri, Inc.	228-378-4581	Y
		Aqua-Kleen	NuFarm Americas Inc.	71368-1	Y
		Weedar 64	NuFarm Americas Inc.	71368-1	Y
		Weedone LV-4 Solventless	NuFarm Americas Inc	71368-14	Y
		Weedone LV-6	NuFarm Americas Inc.	71368-11	Y
		Clean Crop Amine 4	UAP-Platte Chem. Co.	34704-5 CA	Y
		Savage DF	UAP-Platte Chem. Co.	34704-606	Y
Dicamba	AZ, **CA,** CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	Clarity	BASF Ag. Products	7969-137	Y
		Vanquish	Syngenta	100-884	Y
		Weedmaster	BASF Ag. Products	7969-133	Y
		Veteran 720	Nufarm Americas Inc	228-295	Y
		Karmex DF	Griffin Company	1812-362	Y
		Direx 80DF	Griffin Company	1812-362	Y
		Direx 4L	Griffin Company	1812-257	Y
		Direx 4L-CA	Griffin Company	1812-257	Y
Glyphosate	AZ, **CA**, CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	Aqua Star	Albaugh, Inc./Agri Star	42750-59	Y
		Forest Star	Albaugh, Inc./Agri Star	42570-61	Y
		Gly Star Original	Albaugh, Inc./Agri Star	42750-60	Y
		Gly Star Plus	Albaugh, Inc./Agri Star	42750-61	Y
		Gly Star Pro	Albaugh, Inc./Agri Star	42750-61	Y
		Glyfos	Cheminova	4787-31	Y
		Glyfos PRO	Cheminova	67760-57	Y
		Glyfos Aquatic	Cheminova	4787-34	Y
		Accord SP	Dow AgroSciences	62719-322	Y
		Glypro	Dow AgroSciences	62719-324	Y

Herbicides Approved for Use on Public Lands in California

Active Ingredient	States based on current EIS/ROD & Injunctions	Trade Name	Manufacturer	EPA Registration No.	CA Registration No. *
Glyphosate (Cont.)	AZ, **CA**, CO, ID, MT, ND, NM, NV, OK, East-OR, West-OR, SD, UT, WA, WY	Glypro Plus	Dow AgroSciences	62719-322	Y
		Rodeo	Dow AgroSciences	62719-324	Y
		DuPont Glyphosate	DuPont	352-607	Y
		DuPont Glyphosate VMF	DuPont	352-609	Y
		Aquamaster	Monsanto	524-343	Y
		Roundup Original	Monsanto	524-445	Y
		Roundup Original II	Monsanto	524-454	Y
		Roundup Original II CA	Monsanto	524-475	Y
		Honcho	Monsanto	524-445	Y
		GlyphoMate 41	PBI Gordon Corp.	2217-847	Y
		Velpar L	DuPont	352-392	Y
		Velpar DF	DuPont	352-581	Y
		Pronone MG	Pro-Serve	33560-21	Y
		Pronone 10G	Pro-Serve	33560-21	Y
		Pronone 25G	Pro-Serve	33560-45	Y
		Pronone Power Pellet	Pro-Serve	33560-41	Y
Tebuthiuron	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Spike 20P	Dow AgroSciences	62719-121	Y
		Spike 80W	Dow AgroSciences	62719-107	Y
		Spike 40P	Dow Agro Sciences	62719-122	Y
		Spike 80DF	Dow AgroSciences	62719-107	Y
Tebuthiuron+ Diuron	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	SpraKil SK-13 Granular	SSI Maxim Co., Inc.	34913-15	Y
		SpraKil SK-26 Granular	SSI Maxim Co., Inc	34913-16	Y
Triclopyr	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Garlon 3A	Dow AgroSciences	62719-37	Y
		Garlon 4	Dow AgroSciences	62719-40	Y
		Remedy	Dow AgroSciences	62719-70	Y
		Pathfinder II	Dow AgroSciences	62719-176	Y
Triclopyr + 2,4-D	AZ, CA, CO, ID, MT, ND, NM, NV, OK, SD, UT, WA, WY	Crossbow	Dow AgroSciences	62719-260	Y

Notes: 1. This is the approved under the 17 states EIS (2007). 2. If used in areas other than California, refer to the California Vegetation Management FEIS and ROD Risk Assessment, 1988.

*****Just because an herbicide has a federal registration, it may or may not be registered for use in California. This column identifies those formulations for which there is a California registration. For BLM purposes, it is taken one step further; a particular formulated herbicide may have a California and federal registration and still not be available for use on BLM-administered lands because the active ingredient is not approved according to the California Vegetation Management Environmental Impact Statement Record of Decision (2007) and may require tiering to the appropriate EIS.

Adjuvants Approved for Use on Public Lands in California

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Surfactant	Non-ionic	Spec 90/10	Helena	
		Optima	Helena	CA Reg. No. 5905-50075-AA
		Induce	Setre (Helena)	CA Reg. No. 5905-50066-AA
		Activator 90	Loveland	CA Reg. No. 34704-50034-AA
		LI-700	Loveland	CA Reg. No. 36208-50022, WA Reg. No. AW36208-70004
		Spreader 90	Loveland	WA Reg. No. 34704-05002-AA
		UAP Surfactant 80/20	Loveland	
		X-77	Loveland	CA Reg. No. 36208-50023
		Cornbelt Premier 90	Van Diest Supply Co.	
		Spray Activator 85	Van Diest Supply Co	
		R-11	Wilbur-Ellis	CA Reg. No. 2935-50142
		R-900	Wilbur-Ellis	
		Super Spread 90	Wilbur-Ellis	WA Reg. No. AW-2935-70016
		Super Spread 7000	Wilbur-Ellis	CA Reg. No. 2935-50170 WA Reg. No. AW-2935-0002
	Spreader/Sticker	Cohere	Helena	CA Reg. No. 5905-50083-AA
		R-56	Wilbur-Ellis	CA Reg. No. 2935-50144
		Bond	Loveland	CA Reg. No. 36208-50005
		Dyne-Amic	Helena	CA Reg. No. 5095-50071-AA
		Kinetic	Setre (Helena)	CA Reg. No. 5905-50087-AA
		Phase	Loveland	CA Reg. No. 34704-50037-AA
		Silwet L-77	Loveland	CA Reg. No. 36208-50025
		Sylgard 309	Wilbur-Ellis	CA Reg. No. 2935-50161
		Syl-Tac	Wilbur-Ellis	CA Reg. No. 2935-50167

Adjuvants Approved for Use on Public Lands in California

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Oil-based	Crop Oil Concentrate	Crop Oil Concentrate	Helena	CA Reg. No. 5905-50085-AA
		Crop Oil Concentrate	Loveland	
		Herbimax	Loveland	CA Reg. No. 34704-50032-AA, WA Reg. No. 34704-04006
		R.O.C. Rigo Oil Conc.	Wilbur-Ellis	CA Reg. No. 2935-50098
	Methylated Seed Oil	Methylated Spray Oil Conc.	Helena	
		MSO Concentrate	Loveland	CA Reg. No. 34704-50029-AA WA Reg. No. 34704-04009
		Hasten	Wilbur-Ellis	CA Reg. No. 2935-50160 WA Reg. No. 2935-02004
		Super Spread MSO	Wilbur-Ellis	
	Vegetable Oil	Amigo	Loveland	CA Reg. No. 34704-50028-AA WA Reg. No. 34704-04002
		Competitor	Wilbur-Ellis	CA Reg. No. 2935-50173 WA Reg. No. AW-2935-04001
Fertilizer-based	Nitrogen-based	Quest	Setre (Helena)	CA Reg. No. 5905-50076-AA
		Dispatch	Loveland	
		Dispatch 111	Loveland	
		Dispatch 2N	Loveland	
		Dispatch AMS	Loveland	
		Bronc	Wilbur-Ellis	
		Bronc Max	Wilbur-Ellis	
		Bronc Max EDT	Wilbur-Ellis	
		Bronc Plus Dry EDT	Wilbur-Ellis	WA Reg. No.2935-03002
		Cayuse Plus	Wilbur-Ellis	CA Reg. No. 2935-50171

Adjuvants Approved for Use on Public Lands in California

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Purpose or Utility	Buffering Agent	Buffers P.S.	Helena	CA Reg. No. 5905-50062-ZA
		Tri-Fol	Wilbur-Ellis	CA Reg. No. 2935-50152
	Colorants	Signal	Precision	
		Hi-Light	Becker-Underwood	
		Hi-Light WSP	Becker-Underwood	
	Compatibility/ Suspension Agent	E Z MIX	Loveland	CA Reg. No. 36208-50006
		Support	Loveland	WA Reg. No. 34704-04011
		Blendex VHC	Setre (Helena)	
	Deposition Aid	ProMate Impel	Helena	
		Pointblank	Helena	CA Reg. No. 52467-50008-AA-5905
		Intac Plus	Loveland	
		Liberate	Loveland	CA Reg. No. 34704-50030-AA WA Reg. No. 34704-04008
		Weather Gard	Loveland	CA Reg. No. 34704-50042-AA
		Bivert	Wilbur-Ellis	CA Reg. No. 2935-50163
		EDT Concentrate	Wilbur-Ellis	
		Sta Put	Setre (Helena)	CA Reg. No. 5905-50068-AA
	Defoaming Agent	No Foam	Wilbur-Ellis	CA Reg. No. 2935-50136
		Buster Foam	Setre (Helena)	CA Reg. No. 5905-50072-AA
		Cornbelt Defoamer	Van Diest Supply Co.	
	Diluent/Deposition Agent	Improved JLB Oil Plus	Brewer International	
	Foam Marker	Align	Helena	
		R-160	Wilbur-Ellis	
	Invert Emulsion Agent	Redi-vert II	Wilbur-Ellis	CA Reg. No. 2935-50168
	Tank Cleaner	Wipe Out	Helena	
		Kutter	Wilbur-Ellis	
		Neutral-Clean	Wilbur-Ellis	
		Cornbelt Tank-Aid	Van Diest Supply Co.	
	Water Conditioning	Blendmaster	Loveland	
		Choice	Loveland	CA Reg. No. 34704-50027-AA WA Reg. No. 34704-04004
		Choice Xtra	Loveland	
		Choice Weather Master	Loveland	CA Reg. No. 34704-50038-AA

Appendix C Example California BLM Pesticide Use Proposal

Appendix C
Example California BLM Pesticide Use Proposal

PROPOSAL NUMBER:
REFERENCE NUMBER:

FIELD OFFICE _____ **COUNTY** _____

LOCATION:

_____

DURATION OF PROPOSAL:

_____

I. PESTICIDE APPLICATION (including mixtures and surfactants):

	Trade Names	Common Names	EPA Registration No.	Manufacturer	Formulations (Liquid or Granular)	Method of Application
1						
2						
3						

MAXIMUM RATE OF APPLICATION:	
USE UNIT ON LABEL:	**POUNDS ACID EQUIVALENT/ACRE:**
1.	1.
2.	2.

INTENDED RATE OF APPLICATION:

APPLICATION DATES:

NUMBER OF APPLICATIONS:

II. PEST (List specific pest(s) and reason(s) for application):

III. MAJOR DESIRED PLANT SPECIES PRESENT:

IV. TREATMENT SITE: (Describe land type or use, size, stage of growth of target species, slope and soil type).

Example California BLM Pesticide Use Proposal

ESTIMATED ACRES

V. SENSITIVE ASPECTS AND PRECAUTIONS: (Describe sensitive areas [e.g., marsh, endangered, threatened, candidate and sensitive species habitat] and distance to treatment site. List measures taken to avoid impact to sensitive areas).

VI. NON-TARGET VEGETATION: (Describe the impacts, cumulative impacts, and mitigations to non-target vegetation that will be lost as a result of this chemical application).

VII. INTEGRATED PEST MANAGEMENT: (Describe how this chemical application fits into your overall integrated pest management program for the treatment area.)

Originator: _____ Date: _____
Company Name: _____
Phone: _____

Certified Pesticide Applicator:
_____ Date: _____
(Signature)

Field Office Pesticide/Noxious Weed Coordinator
_____ Date: _____
(Signature)

APPROVALS:
_____ Date: _____

BLM Assistant Field Manager
Renewable Resources
(Signature)

APPROVALS (State Office Use Only):
_____ Date: _____
BLM State Pesticide Coordinator
(Signature)

_____ Date: _____
Deputy State Director, Natural Resources,
Lands and Planning
(Signature)

_ CONCUR OR APPROVED
_ NOT CONCUR OR DISAPPROVED
_ CONCUR OR APPROVED WITH MODIFICATIONS

Appendix D Example California BLM Pesticide Application Records Form

Appendix D
Example California BLM Pesticide Application Records Form

1. General Information

a. Project Name: _____
b. Operator: _____
c. Pesticide Use Proposal Number: _____
d. Reference Number: _____

2. Name of Applicator or Employee(s) Applying the Pesticide:

_____
_____

3. Date(s) of Application: _____ _____ _____
(MONTH, DAY, YEAR)

4. Time Frame of Application: _____

5. Location of Application: T_____ , R_____ , and Sec. _____
County _____

6. Type of Equipment Used: _____
_____

7. Pesticide(s) Used: _____
Company or Manufacturer's Name: _____
_____
Trade Name: _____
_____

Type of Formulation: Liquid ____/ Granular ____/

8. Rate of Application Used:

a. Active Ingredient per Acre_____
b. Volume of Formulation per Acre_____

9. Treatment Area

a. Actual Area Treated: _____
b. Total Project Area: _____

10. Primary Pest(s) Involved: _____
_____

11. Stage of Pest Development: _____
_____

12. Site Treated: ____/ Native Vegetation ____/ Seeded Vegetation ____/ Other

13. Weather Conditions:

a. Wind velocity: _____ b. Wind direction _____ c. Temperature _____

14.Monitoring Record (IF INSUFFICIENT SPACE-CONTINUE ON BACK):

This record is required and must be completed, except for monitoring within 24 hours after completion of application of pesticides. This record must be maintained for minimum of 10 years.

Soil and Water Resources (121)

Draft Drainage, Erosion and Sediment Control Plan

121. *Please provide a draft DESCP that contains elements "A" through "I" below outlining the site management activities and erosion/sediment control Best Management Practices (BMPs) to be implemented during site mobilization, grading, construction, and operation of the proposed project. Please provide all preliminary erosion control information for both the construction and operation phases, or provide a statement identifying when such information will be available. Note: The content and level of detail presented in the draft DESCP should be consistent with any site drainage or erosion-related information to be provided in response to the data requests above and the Biology section data requests.*

   a. *Vicinity Map – Provide a map(s) at a minimum scale 1"=100' indicating the location of all project elements, including depictions of all significant geographic features including swales, storm drains, and sensitive areas.*

   b. *Site Delineation – Identify all areas subject to soil disturbance (i.e., project site, lay down areas, all linear facilities, water pick-up areas, landscaping areas, and any other project elements) and show boundary lines of all construction/demolition areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.*

   c. *Watercourses and Critical Areas – Show the location of all nearby watercourses including swales, storm drains, and drainage ditches. Indicate the proximity of those features to the project construction, laydown, and landscape areas, and all transmission and pipeline construction corridors.*

   d. *Drainage Map – Provide a topographic site map(s) at a minimum scale 1"=100' showing all existing, interim and proposed drainage systems and drainage area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours should be extended off-site for a minimum distance of 100 feet in flat terrain.*

   e. *Narrative Discussion of Project Site Drainage – Include a narrative discussion of the drainage management measures to be taken to protect the site and downstream facilities. The narrative should include the summary pages from the hydraulic analysis prepared by a professional engineer/erosion control specialist. The narrative should state the watershed size(s) (in acres) that was used in the calculation of drainage control measures, and include discussions justifying selection of the control measures to be used. Information from the hydraulic analysis should also be provided to support the selection of BMPs and structural controls to divert off-site and on-site drainage around or through the project construction and laydown area, as well as post-construction and operation areas.*

   f. *Clearing and Grading Plans – Identify all areas to be cleared of vegetation and areas to be preserved. Provide elevations, slopes, locations, and extent of all proposed grading using contours, cross sections or other means and include locations of any disposal areas, fills, or other special features. Illustrate existing and proposed topography tying in proposed contours with existing topography.*

g. *Clearing and Grading Narrative – Include a table that identifies all of the following: all project elements where material will be excavated or fill added; the type and quantities of material to be excavated or filled for each element; whether the excavation or fill is temporary or permanent; and the amount of material to be imported or exported.*

h. *Construction Best Management Practices Plan – Identify on the topographic site map(s) the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). Any treatment BMPs used during construction should also address testing of storm water runoff, or storm water that comes in contact with equipment, if necessary, prior to onsite discharge or offsite disposal.*

i. *Operation Best Management Practices Plan – Identify on a separate topographic site map(s) the location of the site-specific BMPs to be employed during operation of the facility. Any treatment BMPs to be used during facility operation should also address testing of storm water runoff, or storm water that comes in contact with equipment, if necessary, prior to onsite discharge or offsite disposal.*

j. *Soil Wind and Water Erosion Control – The plan shall address exposed soil treatments to be used during construction and operation of the proposed project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed project site that would not cause adverse effects to vegetation; BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use.*

k. *BMP Narrative – Provide a narrative discussion on the selection, location, timing, and maintenance schedule for all erosion and sediment control BMPs to be used prior to initial grading, during project element excavation and construction, at final grading/stabilization, and for post-construction/operation. A narrative discussion with supporting calculations should also be included addressing any project specific BMPs. Separate BMP implementation schedules should be provided for each project element for each phase of construction. The maintenance schedule should include post-construction and operation maintenance of structural control BMPs, or a statement when such information will be available. All erosion control measures identified in the DESCP should be consistent with any revised biological impact mitigation measures proposed in response to Biology data requests for avoidance of impacts to desert tortoises and burrowing owls, and for maintenance of aeolian sand habitat.*

Response: The DESCP is provided as Attachment DR121-1.

Attachment DR121-1
Drainage Erosion and Sediment Control Plan

Draft Drainage, Erosion, and Sedimentation Control Plan for the Rice Solar Energy Project

Prepared for

Rice Solar Energy, LLC

March 2010

CH2MHILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

Draft Drainage, Erosion, and Sedimentation Control Plan for the Rice Solar Energy Project

Submitted to

Rice Solar Energy, LLC

March 2010

CH2MHILL

Contents

Acronyms and Abbreviations

ACC	air-cooled condenser
af	acre feet
afy	acre-feet per year
APN	assessor's parcel number
BLM	U.S. Bureau of Land Management
BMP	best management practice
DESCP	Drainage, Erosion, and Sedimentation Control Plan
DTC/CAMA	Desert Training Center/California-Arizona Maneuver Area
LORS	laws, ordinances, regulations, and standards
MSDS	material safety data sheet
MWD	Metropolitan Water District
NECO	Northern and Eastern Colorado Desert Coordinated Management Plan
NPDES	National Pollutant Discharge Elimination System
PCC	Portland cement concrete
RSE	Rice Solar Energy, LLC
RSEP or project	Rice Solar Energy Project
RWQCB	Regional Water Quality Control Board
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
Western	Western Area Power Administration

Rice Solar Reserve Project Drainage, Erosion, and Sedimentation Control Plan

Rice Solar Energy, LLC, (RSE) a wholly owned subsidiary of SolarReserve, LLC, proposes to construct, own, and operate the Rice Solar Energy Project (RSEP or project). The RSEP will be a solar generating facility located on a privately owned site in unincorporated eastern Riverside County, California. The project will be capable of producing approximately 450,000 megawatt-hours of renewable energy annually, with a nominal net generating capacity of 150 megawatts.

The concentrating solar thermal power project components include a central receiver tower, sun-tracking heliostat field and an integral thermal storage system using liquid salt as the heat transfer and storage medium. When electricity is to be generated, the heated salt will be routed to a steam generation system, which generates steam for use in a high-efficiency reheat steam turbine cycle. The RSEP has elected to use dry cooling technology for the steam turbine cycle using an air-cooled condenser (ACC). RSEP's maximum total project water consumption will be approximately 180 acre-feet per year.

RSE has prepared this Drainage, Erosion and Sedimentation Control Plan (DESCP) for the RSEP to demonstrate that construction activities associated with the project will not result in an increase in offsite flooding potential or sedimentation and that the project will meet all local, state, and federal regulatory requirements associated with the protection of water quality and soil resources. The DESCP includes the following elements:

- Vicinity map showing the location of all project elements with depictions of all significant geographic features including swales, storm drains, and sensitive areas
- Site delineation that includes the boundary lines of all construction areas and the location of existing and proposed structures, pipelines, roads, and drainage facilities
- Water courses and critical areas map showing water courses, critical areas, and existing/proposed drainage systems
- Description and map of the drainage measures to be taken that show existing, interim, and proposed drainage systems and drainage area boundaries
- Clearing and grading plans and associated narrative
- Operational Best Management Practices (BMP) narrative and map
- Soil, Wind, and Water Erosion Control plan that addresses exposed soil treatments to be used during construction and operation of the proposed project
- Construction BMP narrative describing the BMPs to be used prior to initial grading, during excavation and construction, final grading/stabilization, and post-construction and operational BMPs to be implemented for the project

A. Vicinity Map

The RSEP will be located in an unincorporated area of eastern Riverside County, California, immediately south of State Route (SR)-62 at milepost 109 about 1 mile east of the junction with Blythe-Midland Road. The nearest active residence and permanent settlement is Vidal Junction, approximately 15 miles northeast, at the junction of SR-62 and U.S. Route 95. To the west, the nearest residences and permanent settlement are approximately 17 miles away at the Metropolitan Water District's (MWD) Iron Mountain Pumping Plant. The nearest town offering significant services is Parker, Arizona, approximately 32 road miles east. Blythe, California, is 40 miles south via Blythe-Midland Road. Twentynine Palms, California, is 75 miles west. In addition to SR-62, nearby infrastructure includes the Arizona-California Railroad and the Colorado River Aqueduct, both of which run east to west just north of SR-62 and just north of and within 600 feet of the northern boundary of the RSEP. (Figure 1). Land surrounding the project site consists mostly of undeveloped open desert that is owned by the federal government and managed by the U.S. Bureau of Land Management (BLM).

The RSEP is located within a larger, private holding that is 3,324 acres (the ownership property). This holding includes portions of Section 24 and 25, Township 1 South, Range 20 East; and all of Sections 19, 20, 29 and 30, Township 1 South, Range 21 East, San Bernardino Base and Meridian. There are six assessor's parcel numbers (APNs) that make up the ownership property: 801-042-004, 801-062-012, 801-070-003, 801-070-004, 801-100-005, and 801-100-006.

Within this ownership property, the RSEP is sited within a new square-shaped parcel (the project parcel) that will be created by merging what are currently four different assessor's parcels, each of them a discrete section (square mile) of land, resulting in a single 2,560-acre parcel. These are Township 1 South, Range 20 East, Sections 19, 20, 29, and 30. The four parcels are APNs 801-070-003, 801-070-004, 801-100-005, and 801-100-006.

Within the project parcel will be the administration buildings area, heliostat field with power block, and evaporation pond areas (collectively, the project site or facility site), totaling 1,410 acres, which will be surrounded by a security fence. Areas outside of the facility site but within the project parcel will not be fenced or developed as part of the RSEP.

The project site is located in a very sparsely settled portion of the Sonoran Desert. A small crossroads settlement known as Rice was once located just west of the project area, at the junction of SR-62 and the Blythe-Midland Road, but it was abandoned and only ruins of former structures remain.

The RSEP site was used during World War II as Rice Army Airfield, a part of the army's Desert Training Center/California-Arizona Maneuver Area (DTC/CAMA). The Rice Army Airfield and adjacent Camp Rice were part of a three-state ad hoc training environment established to acclimatize troops to desert warfare between 1942 and 1944 and involved infantry, artillery, and air support forces. The DTC/CAMA consisted of more than 14 widely separate encampments or bivouac facilities and large maneuver and training areas surrounding the camps. After World War II, the military disposed of the airfield, transferred it to the county and later sold it into private ownership. Rice Airfield was operated privately until it was abandoned between 1954 and 1958.

The RSEP generator tie-line will follow a 10-mile path from the project site to an intercept point along the existing Western Area Power Administration (Western) Parker-Blythe transmission line, southeast of the project site. A new interconnection substation of approximately 300 by 400 feet (less than 3 acres) will be constructed at the tie-in point for the new circuit breakers that will accommodate the RSEP. The generator tie-line will cross land owned by the federal government and managed by the BLM, as well as two small private parcels. The tie-in line will follow an existing dirt road for 5.4 miles and will require construction of 4.6 miles of a new single-lane, dirt access road. Separately, a short 1-mile span will be constructed to extend the existing low-voltage power distribution network to the project site to supply ancillary facilities.

RSE has applied for a right-of-way grant for the portion of the generator tie-line that crosses public land and has also filed for an interconnection study with Western. Involvement by both BLM and Western will trigger compliance with the National Environmental Policy Act as part of the environmental assessments performed for the project. A location map (Figure 2) shows the proposed RSEP location, the generator tie-line and the location of connection to the Parker-Blythe Transmission Line.

B. Site Delineation

Figure 3 shows a Detailed Site Plan of the RSEP including the construction laydown areas, workforce parking, construction parking, the detention basin area, and the evaporation ponds. The project site contains the RSEP facility; heliostat field, the administration and shop building, and other associated features.

The construction laydown and parking areas will occupy those areas of the plant site that are both inside and outside the edges of the heliostat fields Construction access will be from SR-62 to the plant entrance road. All materials and equipment will be delivered to the site by truck.

Construction of the generating facility, from site preparation and grading to commercial operation, is expected to take place from the first quarter of 2011 to the third quarter of 2013 (30 months total). Major milestones are listed in Table 1.

TABLE 1
Project Schedule Major Milestones

Activity	Date
Begin construction	First Quarter 2011
Begin startup and testing	First Quarter 2013
Begin commercial operation	Third Quarter 2013

There will be a peak workforce of approximately 438 construction craft people, supervisory, support, and construction management personnel on site during construction. The peak construction site workforce level is expected to occur between months 8 and 20.

Construction activities will generally occur between 5 a.m. and 7 p.m. on weekdays and Saturdays. Construction at times may take place on a 24-hour, 7-day-per-week basis to make up schedule deficiencies, to work around extreme mid-day heat during summer months and other extreme weather events, or to complete critical construction activities (e.g., pouring concrete at night during hot weather, working around time-critical shutdowns and constraints). During the commissioning phase of the project, some limited work activities may continue around the clock.

Table 2 provides an estimate of the average and peak construction traffic during the 30-month construction period for the plant and associated linear facilities.

TABLE 2
Average and Peak Construction Traffic

Vehicle Type	Average Daily Trips	Peak Daily Trips
Construction Workers	306	438
Deliveries	51	90
Total	**357**	**528**

The RSEP will receive deliveries of materials from local, regional, and some international points of origin including bulk commodity materials, engineered equipment and machinery, and general construction materials. The RSEP site is not currently served by rail. The RSEP will rely on transport by truck for the final delivery of materials to the site including those materials that are brought into the region by rail or ship. These materials will be trans-loaded onto trucks at various ports and depots for delivery to the site.

Heavy and oversized loads will be delivered using trucks and trailers equipped to handle these specialized loads. Oversized loads will be individually permitted to transport each such load to the site. Heavy and oversized loads are typical of a common power plant or process facility and may include items such as the step-up transformer, the solar receiver panels, steam turbine, generator, tanks, and certain heavy equipment.

The RSEP site is approximately 40 miles from Blythe, 65 miles from Needles, and 75 miles from Twentynine Palms. Major cities in the surrounding region include Yuma, Arizona (85 miles); San Bernardino, California (140 miles); Phoenix, Arizona (150 miles); Riverside, California (172 miles); and Las Vegas, Nevada (200 miles). The port of Long Beach is 235 miles from the RSEP.

Given the remote location of the project site, regional truck deliveries may be routed to the RSEP from Interstate 10 and Interstate 40, accessing the site via US-95, Desert Center Road, and SR-62. It may be possible to route some deliveries into the local area via rail and off-load the deliveries onto drayage trucks at nearby, existing rail sidings close to the site. If this proves possible, this may reduce by some amount the quantity and or frequency of

long-haul truck trips and may ease traffic burden on surrounding highways and through local communities.

Also, because of the remote location of the site, RSE will make available a construction workforce RV/trailer parking camp on the project site near the parking and laydown areas at the north end of the heliostat field. The workforce camp will offer spaces for up to 300 trailers or RVs (in keeping with the county requirement that limits trailer parks to 20 per acre), electrical hookups, and mobile water and sanitary sewer service for the trailers and RVs.

Raw process water will be supplied from two onsite wells. It will be treated and used for steam-cycle makeup, heliostat washing, liquid salt system testing during commissioning, boiler makeup, and domestic needs. Each well will have sufficient capacity to supply water for the plant needs throughout the expected 30-year operational life of the plant. Of the two wells, one will be the primary source and one will be the secondary source. The amount of process water used would no more than 180 acre-feet per year (afy), assuming a 37 percent operating capacity factor (3,286 hours).

Two wells exist at the site. Rice 1 is completed in the upper alluvium and is not suitable as a source of water for the project because of low yield and high TDS. Rice 2 is completed in the lower alluvial aquifer and underlying Bouse Formation and, with modifications, can be developed as an adequate water supply for the project. A single well is not sufficient to meet construction water demand; therefore, one new well will be drilled early in the construction phase to supplement Rice 2. Groundwater will be put through a pretreatment system and further purified for use as boiler makeup water and for pressure-washing of the heliostat field.

Heliostat wash water will be drawn from the RSEP groundwater wells. There will be approximately 260 days of washing per year (weekdays only), for a total of 37 washings per year, per heliostat. The maximum number of washings per year would be 52. The annual average volume of water required for heliostat washing is expected to be 39 afy, and the maximum amount would be approximately the same.

Hydrotesting the liquid salt system requires flushing of the salt tanks prior to the start of operation. Other hydrotesting would require significantly less water. The amount of water used in this process will be 7,000,000 gallons, which is the capacity of one tank (5,600,000 gallons) plus an additional 25 percent.

The boiler blowdown stream consists of water purged continuously from the boiler during normal operations to control the concentration of dissolved solids, silica, and pH in the boiler following accepted practices and guidelines for corrosion control. Boiler blowdown flow is purged directly from the boiler steam drum and discharged to a flash tank. Demineralized water is injected into the blowdown flow to limit the temperature of (quench) the blowdown water to prevent rapid flashing and over-pressurization when the blowdown water reaches the flash tank, which is vented to atmospheric pressure. The flash tank collects and retains a minimum volume of water and drains excess volumes in equilibrium, discharging to the evaporation ponds in a relatively continuous flow. When the power plant is operating normally under steady-state conditions, cycle feedwater makeup rate and boiler blowdown rate are equal. Boiler blowdown flows are estimated at 31 afy.

The rate of consumption on this basis is approximately 52 gallons per minute for an operational year of 3,286 hours. Flows may vary during transient conditions such as startup, load changes, and shut down.

Sanitary waste streams will be generated at the administrative building near the entrance to the plant in the north and at the operations building and maintenance areas within the power block. Each area will have a kitchen and the required quantity of toilets and or showers to support the crew size. At these locations, a septic tank and leach field will be used to capture and treat the flows. Two permanent leach fields will be constructed, one near the power block and one near the administration building area at the north end of the field. When required, the septic tank (solids holding tank) will be cleaned out by a vacuum truck, and the wastes will be disposed of at a licensed facility.

The plant will include a potable water treatment system to treat raw water to potable-quality water for personnel health (drinking), if necessary, and other necessary uses around the facility. The system will be sized to accommodate a maximum of 47 operations and maintenance personnel. Consumption is estimated at a maximum of 60 gallons per person per day. The rate of consumption on this basis is approximately 5 gallons per minute per hour of operation. The potable water system will discharge to the wastewater evaporation ponds.

Diesel fire water pumps will be onsite and supplied by onsite water tanks located adjacent to the aboveground diesel storage tanks. The water source will supply water in the event of an emergency.

C. Watercourses and Critical Areas

RESP is surrounded by several nearby areas of special BLM management. The proposed solar site is located approximately 2 miles south of BLM's Turtle Mountains Wilderness, 5 miles northeast of the Palen/McCoy Wilderness, 3 miles north of the Rice Valley Wilderness, and 9 miles northwest of the Riverside Mountains Wilderness. This parcel of private land is bordered by SR-62, the Arizona and California Railroad, and the Colorado River Aqueduct (all three run parallel to each other) on the north, private land to the west, and BLM land to the east and south. The BLM manages most of the surrounding lands, with some private holdings interspersed. The proposed generator tie-line interconnection point is within less than a mile from the Rice Wilderness and immediately adjacent to the Riverside Mountains Wilderness. There are also numerous historical mining operations in the local mountains.

The local vegetation within the Rice Valley is dominated by Sonoran creosote bush scrub but a dune system is located along the southern end of the valley. This dune habitat is part of the eastern end of one of the largest dune systems in the California Desert and extends from the Cadiz Valley to Ward Valley. These dunes are immediately south of the RSEP and extend southward to the base of the Big Maria Mountains. The former 3,770-acre Rice Valley Dunes Off-Highway Recreation Area is located immediately south of the proposed solar site. The BLM closed this area to vehicle traffic in 2002 through the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) (BLM, 2002) due, in part, to lack of use.

The RSEP site has a very slight slope (less than 2 percent overall). The site generally slopes from north to south with elevations of approximately 920 to 750 feet above mean sea level. The property is comprised of creosote bush scrub vegetation. Average annual precipitation ranges from about 3 inches at the lower elevations, to 8 inches in the higher elevations of the mountains west of the Rice Valley (DWR, 2004). Surface runoff from the mountains drains toward the center of the valley, except in the eastern part of the valley, where Big Wash drains to the Colorado River.

Average annual precipitation in the Chuckwalla Planning Area is reported as 430,000 acre-feet (af). Average annual runoff for the area is 5,000 af and occurs primarily during thunderstorms. There are no perennial streams in the planning area and most of the moisture from rain is lost through evapotranspiration. The Colorado River Aqueduct flows in an east to west direction within 1,000 feet north of the RSEP site. Because the aqueduct is a manmade feature, is concrete lined within the hydrologic unit, and is a controlled feature, it does not affect the natural hydrology of the landscape (Figure 4) (State Water Resources Control Board [SWRCB], 2007).

Although considered within the West Basin of the Colorado River, which drains primarily into the Salton Sea Trough, Rice Valley is a sink within no broader hydrological connectivity. Rice Valley has a small watershed and lacks any major washes. Streams, washes and playas are dry most of the year, with surface water only present in response to storm events. Although it is a sink, there are no perennial surface water sources and there is no evidence that a lake ever formed in the Valley during wetter climatic periods (BLM, 2007). No wetlands or waters were identified in the project area.

During construction, all logistics, laydown, and parking will be contained within the approximately 1,504-acre fenced project footprint. Other than the generator tie-line, during operation, all project facilities including parking areas, administration buildings, water treatment system, a 230-kV switchyard, the approximately 1,370-acre heliostat field and associated power generation, and evaporation ponds will also be contained within this fenced boundary. RSEP is designed to operate with the use of dry cooling technology, which is expected to result in the annual consumption of no more than 180 af of water. Within this larger 1,504-acre construction area, the permanently disturbed final fenced property that will be used during operation is 1,410 acres in size.

The generator tie-line extends for 10.0-miles from the RSEP fenceline southeast to the new interconnection substation. The new generator tie-line will be located primarily on BLM land and will include the establishment of approximately 4.6 miles of new dirt service roadway and a new 300- by 400-foot substation at the point of interconnection. The remaining 5.4 miles of generator tie-line will be located adjacent to an existing dirt road (Rice Valley Road), which will serve as its access road.

The entire 1,504-acre solar site will be graded and fenced for security and special-status species (tortoise) exclusion. Offsite stormwater will be directed around the solar site and onsite runoff will be directed toward detention basins located in the southern portion of the heliostat field.

During construction of the facilities, water will be required for soil moisture conditioning during the earthmoving operations and for dust control. During the grading and heavier site disturbance portion of the project (expected to be 12 months), water use is expected to be approximately 35 af per month (on average). During the remainder of construction (expected to be 15 months), water use is expected to be approximately 24 af per month (on average). The average water use over the 30-month construction period would be approximately 29 af per month, or about 780 afy.

Surface water impacts are anticipated to be related primarily to short-term construction activities and would consist of increased turbidity from erosion of newly excavated or placed soils. Activities such as grading can potentially destroy habitat and increase rates of erosion during construction. Additionally, construction materials could contaminate runoff or groundwater if not properly stored and used. Compliance with engineering and construction specifications, following approved grading and drainage plans, and adhering to proper material handling procedures will ensure effective mitigation of these short-term impacts. BMPs for erosion control will be implemented. Additionally, erosion and sediment controls, surface water pollution prevention measures, and other BMPs will be developed and implemented for both construction and operational phases. These plans will be prepared in accordance with local agency requirements and the National Pollutant Discharge Elimination System (NPDES) construction permit issued by the SWRCB.

Table 3 describes estimated properties of the soil series that may occur in and around the project site and along the generator tie-line. As indicated above, soils have not been mapped in this part of Riverside County, and generalized soils information was obtained from STATSGO2. Detailed Natural Resources Conservation Service soil surveys typically have a scale of 1:24,000, with differentiation between soil units at a landscape scale of about 5 acres. The U.S. General Soils Map used for this soils investigation was produced at a scale of about 1:250,000, meaning that soil units are mapped at a coarser scale and are generally not sufficiently detailed for project-level analysis. The discussion that follows is based on data from the U.S. General Soil Map of the U.S. and, therefore, has limited usefulness for performing project-level evaluations. As shown on Figure 5, Rositas and Carrizo soils may occupy most of the project site, including the generator tie-line corridor. These soils are formed from alluvium and eolian deposits, and demonstrate the importance of water and wind erosion and depositional processes in this desert landscape. These soils are estimated to have a fairly coarse texture near the soil surface and generally low potential for erosion by water.

Wind erosion potential may be high where there are few rock fragments on the soil surface; where vegetative cover is low; and where soils have loose, sandy textures in the surface horizon. The Preliminary Geotechnical Engineering Report (Terracon Consultants, 2009) indicates the near surface soils are dense silty sand and poorly graded sand. Overall, the soils are estimated to have a low shrink-swell potential because soils of these series generally have low clay content; however, the Terracon report indicates that some soils have a moderate to high tendency for hydro-compaction when wetted under loaded conditions. The report also indicates the site and the site soils are suitable for the proposed construction.

TABLE 3
Soil Series Descriptions and Characteristics*

Map Unit	Description
s1137	**Rositas-Carrizo** These soil series are estimated to be the dominant soils in the project area. **Rositas soil series:** Formation: Dunes and sand sheets, formed in eolian material, with slopes ranging from 0 to 30 percent Typical profile: Fine sand to a depth of 60 inches (but soil textures can include sand, loamy sand, fine sand, or loamy fine sand; the 10- to 40-inch control section has less than 15 percent coarse and very coarse sand). Shrink-swell capacity: Estimated to be low, since clay content is 0 to 10 percent Depth and drainage: Very deep; somewhat excessively drained Permeability: Rapid Runoff: Negligible to low Inherent fertility: Low Capability class: Information not available Taxonomic class: Mixed, hyperthermic Typic Torripsamments **Carrizo soil series:** Formation: Floodplains, alluvial fans, fan piedmonts, and bolson floors, formed in mixed alluvium, with slopes ranging from 0 to 15 percent Typical profile: Extremely gravelly sand over stratified extremely gravelly coarse sand to very gravelly coarse sand (but soil textures can include coarse sand, sand, loamy coarse sand, or loamy sand) Shrink-swell capacity: Low: clay content averages 0 to 8 percent Depth and drainage: Very deep, excessively drained Permeability: Rapid or very rapid Runoff: Negligible to low Inherent fertility: Low Capability class: Information not available Taxonomic class: Sandy-skeletal, mixed, hyperthermic Typic Torriorthents
s1140	**Rillito-Gunsight** This generalized soil unit occurs to the northwest of the project boundary. **Rillito soil series:** Formation: Mixed alluvium, on fan terraces or stream terraces, with slopes predominantly from 0 to 5 percent but ranging up to 40 percent Typical profile: Gravelly sandy loam over gravelly loam and weakly lime-cemented gravelly sandy loam (soil textures can include fine sandy loams, sandy loams and loams) Shrink-swell capacity: Information not available Depth and drainage: Very deep, somewhat excessively drained Permeability: Moderate Runoff: Slow or medium Inherent fertility: Low Capability class: Information not available Taxonomic class: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocalcids **Gunsight soil series:** Formation: Alluvium from mixed sources, on fan terraces or stream terraces, with slopes of 0 to 60 percent Typical profile: Very gravelly loam over extremely gravelly loam and extremely gravelly sandy loam (soil textures can range from fine sandy loam, sandy loam and loam in the control section) Shrink-swell capacity: Information not available; clay content averages less than 18 percent Depth and drainage: Very deep, somewhat excessively drained Permeability: Moderate or moderately rapid Runoff: Very low to high Inherent fertility: Low, contains substantial calcium carbonate Capability class: Information not available Taxonomic class: Loamy-skeletal, mixed, superactive, hyperthermic Typic Haplocalcids

TABLE 3
Soil Series Descriptions and Characteristics*

Map Unit	Description
s1136	**Rositas-Dune land-Carsitas** This map unit occurs south and southwest of the project site and is likely representative of soils that occur in the Rice Valley dune system. These dunes historically have been used for off-highway vehicle recreation, but BLM has closed the Rice Valley Dunes area for off-road use.

* Soil characteristics are based on soil mapping descriptions provided in the Official Soil Series Descriptions (http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi). Soil descriptions are provided above for those soil series that could be directly affected by the RSEP, as well as for other soil series, which are well outside of the project area but are shown on Figure 5. These descriptions represent the best available information from published literature, but onsite evaluation of soils would be necessary for purposes of project design and engineering.

The Preliminary Geotechnical Engineering Report (Terracon Consultants, 2009) estimated that Carrizo soil associations are present on the site; however, it also noted that cemented caliche layers at depth could hinder percolation of water through subsurface horizons.

D. Drainage Map

Figure 6 shows an overview of the RSEP Drainage scheme. Figures and 7 and 8 show the existing (pre-project construction) and proposed drainage systems (post-project construction and drainage area boundaries.

E. Drainage Narrative

There are no existing structures on the proposed site, or a stormwater system other than percolation into the existing soils and sheet runoff. The Attachment to this document contains the Conceptual Drainage Study for the project, which includes stormwater calculations, pre- and post-development drainage plans, road and ditch design, and the detention basin design.

Offsite stormwater flows originate from an area north of SR-62, the Arizona and California Railroad, and the Colorado River Aqueduct. Because the railroad and aqueduct parallel the highway (east to west), small dikes have been constructed to control the flow of water across these features (north to south). The dikes direct the offsite flows from the north to specific channels/culverts over the aqueduct and under the railroad. Two of these channels are located near the project site.

The stormwater runoff from these local watersheds flows over an inverted siphon of the aqueduct, under the railroad, and then over SR-62 at small "dips" in the roadway. For site development, small ditches will be constructed on the outside of the site, along the perimeter of the north portion of the heliostat field, to direct these offsite flows around the outside of the site. The ditches, along with an elevated perimeter road, will be the features that redirect the offsite flows around the heliostat fields, much as the Army constructed two dikes in the early 1940s to direct offsite flows around Rice Army Airfield. The ditches have been sized to accommodate 100 percent of the offsite flows expected to drain to them,

although a portion of the offsite flows appear to continue to be diverted by the small dikes constructed as part of the airfield.

Onsite stormwater runoff in the heliostat field will be allowed to sheet flow along its current drainage pattern to the south end of the heliostat field. At this location, an expansive and shallow detention basin (approximately 30 af) will be constructed to detain any increase in storm flows and to provide a location for sediment control. The detention area will attenuate the post-development 100-year, 24-hour storm event runoff and discharge at the pre-development 100-year, 24-hour storm event flow rate. The Attachment shows the conceptual project drainage plan and stormwater calculations used to size the stormwater detention basin

During operation, stormwater from the equipment drains will go to the oil/water separator for treatment and will be discharged into an aggregate waste stream that combines all other waste streams and is routed to the onsite evaporation ponds. Any other stormwater flowing directly onsite will be allowed to sheet flow across the site to the onsite detention facility. The site will be graded to accommodate this process. Offsite stormwater will be routed around each side of the site and will percolate into the surrounding soils. There are no nearby waterways that have the potential to be inundated by onsite or offsite stormwater flow; therefore, there will be no discharge of stormwater to any nearby waterways, and no impacts on waterways from stormwater runoff and drainage will occur.

Potential water supply impacts from construction will be limited to surface water runoff during excavation and construction. Such construction impacts are small and will be controlled through implementing this DESCP, a Storm Water Pollution Prevention Plan (SWPPP) and associated BMPs, and practicing proper housekeeping at the construction site. The site grading and drainage will be designed to comply with all applicable laws, ordinances, regulations, and standards (LORS). The general site grading will establish a working surface for construction and plant operating areas, will provide positive drainage from buildings and structures, and will provide adequate ground coverage for subsurface utilities.

Successful implementation of this DESCP and SWPPP will ensure that construction impacts on water resources are mitigated to a less-than-significant level. SWPPP procedures include submitting a Notice of Intent to the Colorado River Basin Regional Water Quality Control Board (RWQCB) and developing the SWPPP prior to the start of construction activities.

Water used for dust control and soil compaction during construction will not result in discharge. During the construction period, sanitary waste will be collected in portable toilets (no discharge) supplied by a licensed contractor for collection and disposal at an appropriate receiving facility. Equipment wash water will be collected and disposed of offsite.

F. Clearing and Grading

Construction of the generating facility, from site preparation and grading to commercial operation is expected to take place over 30 months, starting in the first quarter of 2011. During construction, approximately 1,504 acres of land associated with the plant will be disturbed. Nominal grading will occur for the construction of the power block, which will be graded to create a generally uniform elevation for construction of the plant power island

facilities, the roads, and the detention and evaporation pond areas. Additionally, grading will occur for the offsite parking, the offsite workforce trailer and RV park site, the construction office and lay down area, approximately 1 acre of disturbance for the electrical interconnection substation (to connect the 12-kV generator tie-line to the site), a band of disturbance 40 feet beyond the security fence for slope grading and perimeter ditch construction.

During construction, installation of the transmission structures and conductors will require disturbance of less than 1 acre in aggregate. This area includes several pull sites and a few splicing sites. However, the generator tie-line construction will require creation of a 12-foot-wide dirt access road for 4.6 miles of the line between the project fenceline and Rice Valley Road, for approximately 7 acres of disturbance.

Any grading in the heliostat field will be completed with cuts and fills of less than 6 inches. Vegetation in the heliostat area will be cut or removed only as needed to allow installation of the heliostats. The root structure of vegetation will be allowed to remain to enhance soil stability and to facilitate re-growth.

During project construction, water drawn from onsite wells will be required primarily for dust suppression and soil moisture conditioning during grading activities. During the grading and heavier site disturbance portion of the project (expected to be 12 months), water use is expected to be 35 af per month on average. During the remainder of construction (expected to be 18 months), water use is expected to be 20 af per month on average. Because of the short duration of construction activities, no significant adverse impacts on water supply are expected to result. The average water use for construction would be 29 af per month, or about 350 afy. impacts to groundwater resources will occur from this project. Figure 9 shows the Conceptual Grading and Drainage Plan.

G. Clearing and Grading Narrative

The information provided above and the Conceptual Grading and Drainage Plan is preliminary and will be updated and expanded upon once the clearing and grading plans are finalized to the start of construction. When final plans are written, the amount of cut and fill planned for specific project components will be listed and described.

H. Best Management Practices

Figure 10, Draft Erosion Sediment Control Plan shows the preliminary BMP design, detailing the primary construction BMPs including the stabilized construction entrance, fiber rolls to be used around the perimeter of the heliostat field, and an aggregate base that will be applied on the laydown areas. A Final Construction BMP map will be developed prior to construction. Post construction BMPs will be identified through an Operational Storm Water Pollution and Prevention Control Plan required by the RWQCB, to be completed prior to the start of project construction.

I. Best Management Practices Narrative

The following information describes all potential BMPs that could be implemented at the RSEP. The final DESCP and SWPPP will contain detailed BMP maps and will prescribe specific project Site BMPs. During construction, specific project BMPs may be changed based on project conditions on-site. If BMPs are change from the original BMPs, an amendment will be completed by the Contractor and/or Site Manager and kept on-site.

Narrative descriptions of BMPs to be used during the project are listed by category in each of the following sections. The following information is taken from the Preliminary SWPPP for the Rice Solar Energy Project, Riverside California (May 2009). Refer to the SWPPP for BMP Fact Sheets.

Erosion Control

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in storm water runoff. Erosion-control BMPs protect the soil surface by covering and/or binding soil particles. This project will incorporate erosion control measures required by the contract documents, and other measures selected by the Contractor and/or Site Manager. The following practices will be implemented for effective temporary and final erosion control during construction:

- Preserve existing vegetation where required and when feasible.
- Apply temporary erosion control to remaining active and non-active areas as from the California Stormwater BMPs Handbook – Construction as required by the contract documents or as necessary based on the judgment of the Contractor and/or Site Manager. Reapply as necessary to maintain effectiveness.
- Implement temporary erosion control measures at regular intervals throughout the defined rainy season to achieve and maintain the contract's disturbed soil area requirements. Implement erosion control prior to the defined rainy season.
- Stabilize non-active areas as soon as feasible after the cessation of construction activities.
- Control erosion in concentrated flow paths by applying erosion control blankets, erosion control seeding, and lining swales as required in the contract documents.
- At completion of construction, apply permanent erosion control to all remaining disturbed soil areas.

Sufficient erosion control materials will be maintained onsite to allow implementation in conformance with Permit requirements. This includes implementation requirements for active areas and non-active areas that require deployment before the onset of rain.

The following BMPs have been selected for Erosion Control:

- EC-1, Scheduling
- EC-2, Preservation of Existing Vegetation
- EC-3, Hydraulic Mulch

- EC-6, Straw Mulch
- EC-7, Geotextiles, Plastic Covers and Erosion Control Blankets/Mats
- EC-9, Earth Dikes and Drainage Swales

EC-1, EC-2 Scheduling and Preservation of Existing Vegetation

The project schedule will sequence construction activities with the installation of both soil stabilization and sediment control measures. BMPs will be deployed in a sequence to follow the progress of grading and construction. The construction schedule will be arranged as much as practicable to leave existing vegetation undisturbed until immediately prior to grading.

EC-3, EC-6 Hydraulic Mulch and Straw Mulch

Straw mulch may be applied to all bare areas around the perimeter to the Site that will drain directly to offsite drain areas and may also be applied to the disturbed areas adjacent to excavations and on shallow slopes surrounding the Site, and used to cover exposed soil and stockpiled material areas.

EC-7 Geotextiles, Plastic Covers and Erosion Control Blankets/Mats

Polyethylene covers may be used to cover exposed soil (including the berm) and stockpiled material areas. Covers will be placed over stockpiles prior to forecast storm events, and anchored to prevent damage by wind.

EC-9 Earth Dikes and Drainage Swales

Earth dikes or swales may be used to intercept and divert sediment-laden storm water to sediment traps to control sheet flow over the Site and sediment build up in the sediment basin area.

Specific Wind and Water Erosion Control for Cryptobiotic Soils on the RSEP Site

Cryptobiotic crusts are fragile and are extremely susceptible to destruction by crushing. Project activities will destroy the structure of these crusts and once damaged will be highly susceptible to erosion, flooding, deflation, dust storms, invasion of exotic weeds and/or chemical impoverishment due to loss of organic material and precipitation of minerals.

In order to mitigate for the loss of the crust, the resulting bare soils will need to have appropriate BMPs applied on them during soil disturbance activities including mobilization, grading, construction, and demobilization, and until permanent BMPs are installed.

Temporary BMPs include soil binders, hydraulic mulches, and geotextiles and mats. Soil binding consists of application and maintenance of a soil stabilizer to exposed soil surfaces to temporarily prevent water and wind-induced erosion of exposed soils on construction sites. Hydraulic mulch consists of various types of fibrous materials mixed with water and sprayed onto the soil surface in slurry form to prevent water and wind erosion. Geotextiles and mats are used to cover the soil surface to reduce erosion from rainfall impact and hold soil in place. Choosing an appropriate BMP for the RSEP project site will be contingent on site-specific criteria including the size of the area(s) to be covered, the length of time the BMP will be used, soil type, humidity, the season when the BMPs will be installed and used,

the availability of water to install some of the BMPs, and the availability of the BMP in the market place. There are a number of types of each of the three BMP categories listed above it will be the responsibility of the Contractor and/or Site Manager to select the best BMP for the project location based on current site conditions. To ensure non-toxicity, each manufacturer should be requested to supply the material safety data sheets (MSDSs) for their product prior to the purchase of the product. Non-toxic products are readily available in the market place. BMP Fact Sheets EC-3 Hydraulic Mulch, EC-5 Soil Binders, and EC-7 Geotextiles and Mats discuss a number of different types of BMPs and are included in this data response. Wind Erosion Control BMPs that may also be appropriate to use are wet suppression (watering) chemical dust suppression, and gravel surfacing. BMP Fact Sheet WE-1 Wind Erosion Control is also included in this data response. The BMP Fact Sheets are published by the California Stormwater Quality Association (November 2009).

Permanent BMPs would be required during project operations and installed post-construction. These materials can include gravel mulch, rock, modular block porous pavement, concrete, and others. Final project design will include specifications for permanent BMPs.

Sediment Control

Sediment controls are structural measures that are intended to complement and enhance the soil stabilization (erosion control) measures and reduce sediment discharges from construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. This project will incorporate minimum temporary sediment control requirements, temporary sediment control measures required by the contract documents, and other measures selected by the Contractor or Site Manager.

Sediment control BMPs will be installed at all appropriate locations along the Site perimeter at all times during the rainy season. During the non-rainy season, the sediment basin or trap shall be used to capture the sediment discharges.

Sufficient quantities of temporary sediment control materials will be maintained onsite throughout the duration of the project, to allow implementation of temporary sediment controls in the event of predicted rain, and for rapid response to failures or emergencies, in conformance with other Permit requirements. This includes implementation requirements for active areas and nonactive areas before the onset of rain.

The following BMPs have been selected for Sediment Control:

- SE-1, Silt Fence
- SE-2, Sediment Basin
- SE-3, Sediment Trap
- SE-5, Fiber Rolls
- SE-7, Street Sweeping and Vacuuming
- SE-8, Sandbag Barrier

SE-1 Silt Fence

Silt fences shall be installed along the perimeter of the construction site to intercept sediment laden runoff and run-on at locations where run-on and runoff can occur. Silt fences shall be used to protect the perimeter drainage swale from sediment built up. Silt fences will also be placed around the base of temporary stockpile areas.

SE-2 Sediment Basin

A sediment basin area shall be located in the lowest part of the site and may be used in association with drainage swales and fiber rolls to retain runoff and allow excessive sediment to settle prior to discharge. If the basin area is not dry within 72 hours, it must be pumped dry. If it fills over capacity, there may be localized flooding however this shall be monitored by the Contractor or Site Manager to ensure surrounding properties are not impacted. Refer to the Attachment for calculations of the required basin area size.

SE-3 Sediment Traps

In conjunction with the sediment basin area, sediment traps shall be constructed to collect, intercept and trap sediment-laden runoff.

SE-5 Fiber Rolls

Fiber rolls may be placed along the perimeter of the Site to intercept runoff and provide removal of sediment from the runoff. Additionally fiber rolls will be placed perpendicularly to the flow of water within onsite drain ditches to remove sediment from the runoff.

SE-7 Street Sweeping and Vacuuming

Street sweeping and vacuuming is required to remove the sediment from the public and private roadways, typically at the point of egress.

SE-8 Sandbag Barriers

Sandbag barriers (or rock barriers) may be placed at the toe of slopes or stockpiles, at sediment traps at culvert/pipe outlets and along the perimeter of the Site as a linear sediment control measure

Wind Control

The following BMPs have been selected to control dust from the construction site:

- WE-1, Wind Erosion Control

WE-1 Wind Erosion Control

Non-potable water will be applied to disturbed soil areas of the Site as needed to control dust and maintain optimum moisture levels for compaction. The water will be applied using water trucks. Project soils will be disturbed and exposed during dates allocated in the Construction Schedule. Water applications will be concentrated during the late summer and early fall months.

Wind Erosion Control and Water Conservation Practices BMPs will be implemented to provide dust control while at the same time preventing storm water runoff. Water

application rates will be minimized as necessary to prevent runoff and ponding and water equipment leaks will be repaired immediately.

During windy conditions (forecast or actual wind conditions of approximately 20 miles per hour or greater), dust control will be applied to disturbed areas, including haul roads to adequately control wind erosion. Stockpile management using silt fences, sand bag barriers and plastic covers will be implemented to prevent wind dispersal of sediment from stockpiles.

Tracking Control

The following BMPs have been selected to reduce sediment tracking from the construction site onto private or public roads:

- TC-1, Stabilized Construction Entrance/Exit
- TC-2, Stabilized Construction Roadway

TC-1 Stabilized Construction Entrance/Exit

A stabilized construction entrance/exit will be constructed as shown on Figure 10. The Site entrance/exit will be stabilized to reduce tracking of sediment as a result of construction traffic. The entrance will be designated and graded to prevent runoff from leaving the Site. Stabilization material will be 3- to 6-inch crushed aggregate. The entrance will be flared where it meets the existing road to provide an adequate turning radius. The Site entrance/exit shall only be installed to reduce tracking of sediment during dirt-hauling activities that extend over a one-week time period.

TC-2 Stabilized Construction Roadway

The construction roadway through the Site will also be designated and stabilized to prevent erosion and to control tracking of mud and soil material onto adjacent roads. The roadway will be clearly marked for limited speed to control dust. On site vehicle speed shall be limited to reduce air born dust creation. Refer to Figure 10 for entrance/exit and construction roadway locations.

Aggregate will placed as a stabilization material, if needed. A regular maintenance program will be conducted to replace sediment-clogged stabilization material with new stabilization material.

Non-Storm Water Discharges

Non-stormwater discharges consist of all discharges which do not originate from precipitation events (i.e. stormwater).

The following BMPs have been selected for non-stormwater discharges:

- NS-1, Water Conservation Practices
- NS-2, Dewatering Practices
- NS-6; Illicit Connection/Discharge
- NS-8, Vehicle and Equipment Cleaning
- NS-9, Vehicle and Equipment Fueling
- NS-10, Vehicle and Equipment Maintenance

- NS-11, Pile Driving Operations
- NS-12, Concrete Curing
- NS-13, Concrete Finishing

NS-1 Water Conservation Practices

Water application rates will be minimized as necessary to prevent runoff and ponding. Water equipment leaks will be repaired immediately. The water truck filling area will be stabilized.

NS-2 Dewatering Practices

Dewatering may be required to remove groundwater from the sediment basin, remove stormwater runoff in the basin area for longer than 72 hours (refer to BMP SE-2) or for maintenance purposes (removal of sediment is required when the storage volume is reduced by one-half).

NS-6 Illicit Connection/Discharge

The Contractor and/or Site Manager will implement the Illegal Connection/Illegal Discharge Detection Reporting BMP throughout the duration of the project.

NS-8, NS-9, NS-10 Vehicle and Equipment Operations

Several types of vehicles and equipment will be used onsite throughout the project, including graders, scrapers, rollers, trucks and trailers and forklifts. BMPs NS-9, Vehicle and Equipment Fueling, and NS-10, Vehicle and Equipment Maintenance will be utilized to prevent discharges of fuel and other vehicle fluids. Except for concrete washout, vehicle cleaning will not be performed onsite.

A temporary fueling area shall be established in the laydown area(s), protected with berms and dikes to prevent runoff and to contain spills. All wheeled vehicles shall be fueled offsite or at the temporary fueling area. Fuel trucks, each equipped with a spill clean-up kit including absorbent spill clean-up materials, shall be used for all onsite fueling, whether at the temporary fueling area or for mobile fueling elsewhere on the site. Drip pans shall be used during all mobile fueling. The fueling truck shall be parked on the paved fueling area during overnight storage.

Drip pans or absorbent pads will be used for all vehicle and equipment maintenance activities that involve grease, oil, solvents, or other vehicle fluids. All vehicle maintenance and mobile fueling operations will be conducted at least 50 feet away from the sediment basin and drainage facilities and on a level graded area.

NS-11 Pile Driving Operations

The Contractor and/or Site Manager will implement the Pile Driving Operations BMP when installing piling for equipment and building foundations.

NS-12, NS-13 Concrete Curing and Finishing

Excess cure water and water from high pressure blasting will be collected and disposed of, and should not be allowed to enter into the sediment basin. Wet blankets will be used wherever possible to eliminate excess cure water.

Waste Management and Materials Pollution Control

Waste management consists of implementing procedural and structural BMPs for collecting, handling, storing and disposing of wastes generated by a construction project to prevent release of waste materials into stormwater discharges.

The following BMPs have been selected for waste management and materials pollution control:

- WM-1, Material Delivery and Storage
- WM-2, Material Use
- WM-3, Stockpile Management
- WM-4, Spill Prevention and Control
- WM-5, Solid Waste Management
- WM-6, Hazardous Waste Management
- WM-8, Concrete Waste Management
- WM-9, Sanitary/Septic Waste Management
- WM-10, Liquid Waste Management

WM-1, WM-2 Material Delivery, Storage and Use

In general, BMPs shall be implemented to help prevent discharges of construction materials during delivery, storage, and use. The general material storage area shall be located in the laydown area. A sandbag barrier, swale, or berm shall be provided around the storage area to prevent run-on from adjacent areas. Watertight containers will be used to store hand tools, small parts, and most construction materials that can be carried by hand, such as paint cans, solvents, and grease.

If hazardous materials are being stored, a separate covered storage/containment facility shall be constructed adjacent to the shipping containers to provide storage for larger items such as drums and items shipped or stored on pallets. Liquids, petroleum products, and substances listed in 40 CFR 110, 117 and 302 shall be contained. This containment volume shall contain rainfall from the 24-hour, 25-year storm event, plus the greater of 10 percent of the aggregate volumes of all containers or 100 percent capacity of the largest container within the boundary.

Very large items, such as framing materials, steel, and stockpiled lumber, will be stored in the open in the general storage area. Such materials will be elevated with wood blocks to minimize contact with run-on.

Spill clean-up materials shall be maintained and stored in the storage area. MSDSs, a material inventory, and emergency contact numbers shall be posted in the area.

WM-3 Stockpile Management

BMP WM-3, Stockpile Management will be implemented to reduce or eliminate pollution of storm water from stockpiles of soil and materials such as Portland cement concrete (PCC), rubble, asphalt concrete, asphalt concrete rubble, aggregate base, aggregate sub-base, pre-mixed aggregate and asphalt binder (so-called “cold mix” asphalt), or other stockpiled materials. Stockpiles shall be surrounded with sediment controls. Plastic covers shall be used to cover exposed soil stockpiled material areas.

WM-4 Spill Prevention and Control

BMP WM-4, Spill Prevention and Control will be implemented to contain and clean-up spills and prevent material discharges to the storm drain system. Employees and subcontractors shall be familiar with potential environmental impacts resulting from the materials they are handling. Good Housekeeping practices shall be implemented to control spills including the use of secondary containment, and designating specific areas for equipment maintenance. This practice will be applied to all solid and liquid materials, including, but not limited to: fuels, lubricants, other petroleum distillates, paints, solvents, cement, mortar, soil stabilizers, and fertilizers. In addition, this practice will be applied to storage areas for chemicals and/or hazardous substances, fuel areas, and vehicles/equipment transporting and handling chemicals and other hazardous substances.

WM-5 Solid Waste Management

BMP WM-5, Solid Waste Management BMPs shall be implemented, if applicable to minimize stormwater contact with waste materials and prevent waste discharges. Solid wastes include wood refuse, metal and glass containers, protective plastic coverings discarded bags, and other discarded materials and rubbish. Solid wastes will be loaded directly onto trucks for offsite disposal. When onsite storage is necessary, solid wastes will be collected and stored in watertight dumpsters in the general storage area of the laydown area. Solid waste will be removed and disposed offsite at least weekly. Liquid wastes, if applicable, will be stored in the covered containment area discussed above for materials storage.

WM-6 Hazardous Waste Management

BMP WM-6, Hazardous Waste Management BMPs shall be implemented, if applicable, to minimize storm water contact with waste materials and prevent waste discharges. Any solid or liquid hazardous wastes shall be stored in appropriate and clearly marked containers in the covered containment area and segregated from other waste and non-waste materials. Wastes shall be stored in sealed containers constructed of a suitable material and shall be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179. All hazardous waste shall be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.

WM-8 Concrete Waste Management

Discharges from concrete placement will consist of rinse water and residual concrete (PCC, aggregates, admixture, and water). Estimated pour dates are shown on the project construction schedule and shall not be conducted during or immediately prior to rainfall events.

Concrete waste management will be implemented in accordance with contract documents and the Concrete Waste Management BMP. Concrete washout facilities will be maintained at the laydown area and designed in accordance with project plans and specifications. All excess concrete and concrete washout slurries shall be discharged to the onsite washout facility for drying or left in the delivery truck and returned to the onsite batch plant for recycling. BMP maintenance, waste disposal, and BMP removal shall be conducted as described in the Concrete Waste Management BMP.

WM-9 Sanitary/Septic Waste Management

The Contractor and/or Site Manager shall implement the Sanitary and Septic Waste Management BMP. Portable toilets shall be located and maintained at the laydown area for the duration of the project. Specific locations will be shown on the final Construction BMP Map. Weekly maintenance shall be provided by a licensed contractor and wastes shall be disposed offsite. The toilets shall be located away from concentrated flow paths and traffic flow.

In accordance with this program, the following activities shall be undertaken:

- All year round:
  - Weather reports will be monitored to track conditions and alert crews to the onset of rainfall events.
  - Disturbed soil areas will be stabilized with temporary erosion control or with permanent erosion control as soon as possible after rough grading is complete.
  - Wind Controls BMPs
  - Tracking Control BMPs
  - Non-Stormwater Discharges BMPs
  - Waste Management BMPs
- During the rainy season:
  - Disturbed areas will be stabilized with temporary or permanent erosion control before rain events.
  - Disturbed areas that are substantially complete will be stabilized with permanent erosion control (soil stabilization) and vegetation (if within seeding window for seed establishment).
  - Prior to forecast storm events, temporary erosion control BMPs will be deployed and inspected.
- During the non-rainy season, the construction schedule will be arranged as much as practicable to leave existing vegetation undisturbed until immediately prior to rough grading.

Post Construction Control Practices

The Owner shall be responsible for ensuring all construction activity is completed as permitted, to implement permanent pollution prevention practices and to maintain permanent structural controls. The following are the post-construction erosion and sediment control BMPs that are to be used at this construction site after all construction is complete, but are not limited to:

- Removal of debris
- Removal of temporary BMP measures (if necessary)
- Implementation of an Operational SWPPP and NPDES Permit

Operation/Maintenance after Project Completion

The post-construction BMPs that are described above will be funded and maintained by owner.

Inspection, Maintenance, and Recordkeeping Procedures

Site inspection and facility maintenance are important features of an effective stormwater management system. The Contractor's qualified personnel will inspect disturbed areas of the site that have not been stabilized, storage areas exposed to precipitation, all control measures, and site access areas to determine if the control measures and stormwater management system are effective in preventing significant impacts to receiving waters.

Inspections will be performed during the non-rainy season once every 2 weeks. Maintenance shall be performed as necessary.

Inspections will be performed before and after storm events and once each 24-hour period during extended storm events to identify BMP effectiveness and implement repairs or design changes as soon as feasible depending on field conditions. The discharger will complete an inspection checklist, which will include the following information:

- Inspection date
- Weather conditions
- A description of any inadequate BMPs
- List of observations of all BMPs
- Corrective actions required, including any changes to the DESCP
- Inspector name, title, and signature

Erosion and Sediment Controls

The following procedures will be used to maintain erosion and sedimentation controls:

- All control measures will be inspected before and after storm events and once each 24-hour period during extended storm events.
- All measures will be maintained in good working order; if a repair is necessary, that repair will be initiated within 24 hours of the report.
- Sediment will be removed from the silt barriers when it has reached one-third of the height of the barrier.
- Silt barriers will be inspected for depth of accumulated sediment, tears, attachment to posts, and stability on a weekly basis.
- Aggregate-covered areas will be inspected for bare spots and washouts.
- The site manager will select individuals to be responsible for inspections, maintenance, repairs, and reporting. The designated inspectors will receive the necessary training from the site manager to properly inspect and maintain the controls in good working order.
- An inspection form will be completed after each inspection.

- The completed inspection forms will be retained on site.

Non-stormwater Controls

The following procedures will be used to maintain the non-stormwater controls:

- All control measures will be inspected before and after storm events and once each 24-hour period during extended storm events.
- All measures will be maintained in good working order; if a repair is necessary, that repair will be initiated within 24 hours of the report.
- The designated inspector will visually observe all drainage areas for the presence of unauthorized non-stormwater discharges and their sources.
- If a spill occurs that cannot be cleaned up before the next rain event, or under other circumstances warranting sample collection, the designated inspector will collect stormwater samples during the first two hours (including weekends or holidays) of discharge. Similarly, if it appears that BMPs have failed or been damaged to the extent that they could result in discharge of pollutants in stormwater, and are discharging potentially impacted water, samples should be collected. Sampling will also be performed in cases where stormwater comes in contact with exposed materials that could potentially contaminate stormwater runoff. The samples should be analyzed for visible and non-visible compounds with the analytical testing suite determined from the specific materials spilled or not contained properly, and for any constituents in the spill that occur in high enough concentrations to cause an impact to water quality.
- The site manager will select individuals to be responsible for inspections, maintenance, repairs, and reporting. The designated inspectors will receive the necessary training from the Site Manager to properly inspect and maintain the controls in good working order.
- An inspection form will be completed after each inspection.
- The completed inspection forms will be retained onsite.

Recordkeeping

Two inspection forms will be completed demonstrating that inspections and maintenance of the control measures are implemented: Erosion and Sedimentation Controls, and Non-stormwater Source Controls. All disturbed areas and materials storage areas require inspection at least daily before and after storm events and once each 24-hour period during extended storm events. After each inspection, the inspector will complete an inspection report and retain a copy of the report. Any maintenance required will be initiated within 24 hours of the inspection.

A copy of this DESCP and any supporting materials must be maintained at the construction site from the date of California Energy Commission approval to the date of final stabilization. All records and supporting documents will be compiled in an orderly manner and maintained on site until final site stabilization is completed.

The generation of reports, as part of the construction process and inspection or amendment procedures, provides accurate records, which can be used to evaluate the effectiveness of this DESCP and document compliance. Changes in design or construction of the stormwater management system are documented and included with the DESCP to facilitate review or evaluation.

J. References

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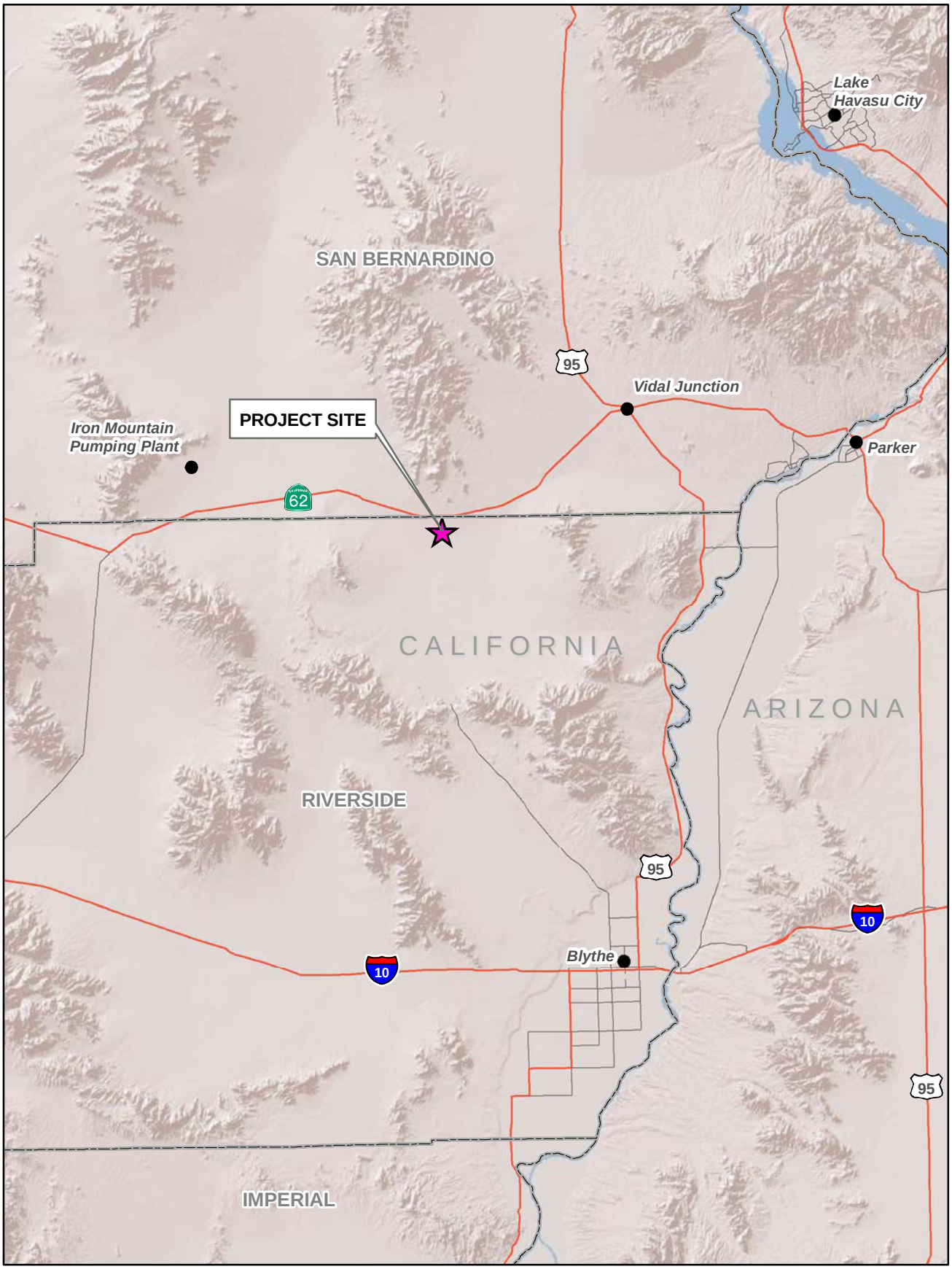
Worley Parsons. May 2009. *Preliminary Stormwater Pollution Prevention Plan for Rice Solar Energy Project, Riverside County*.

Figures



LEGEND

PROJECT SITE

COUNTY BOUNDARIES

N

0 5 10

Miles

FIGURE 1
VICINITY MAP
Rice Solar Energy Project
DESCP

CH2MHILL

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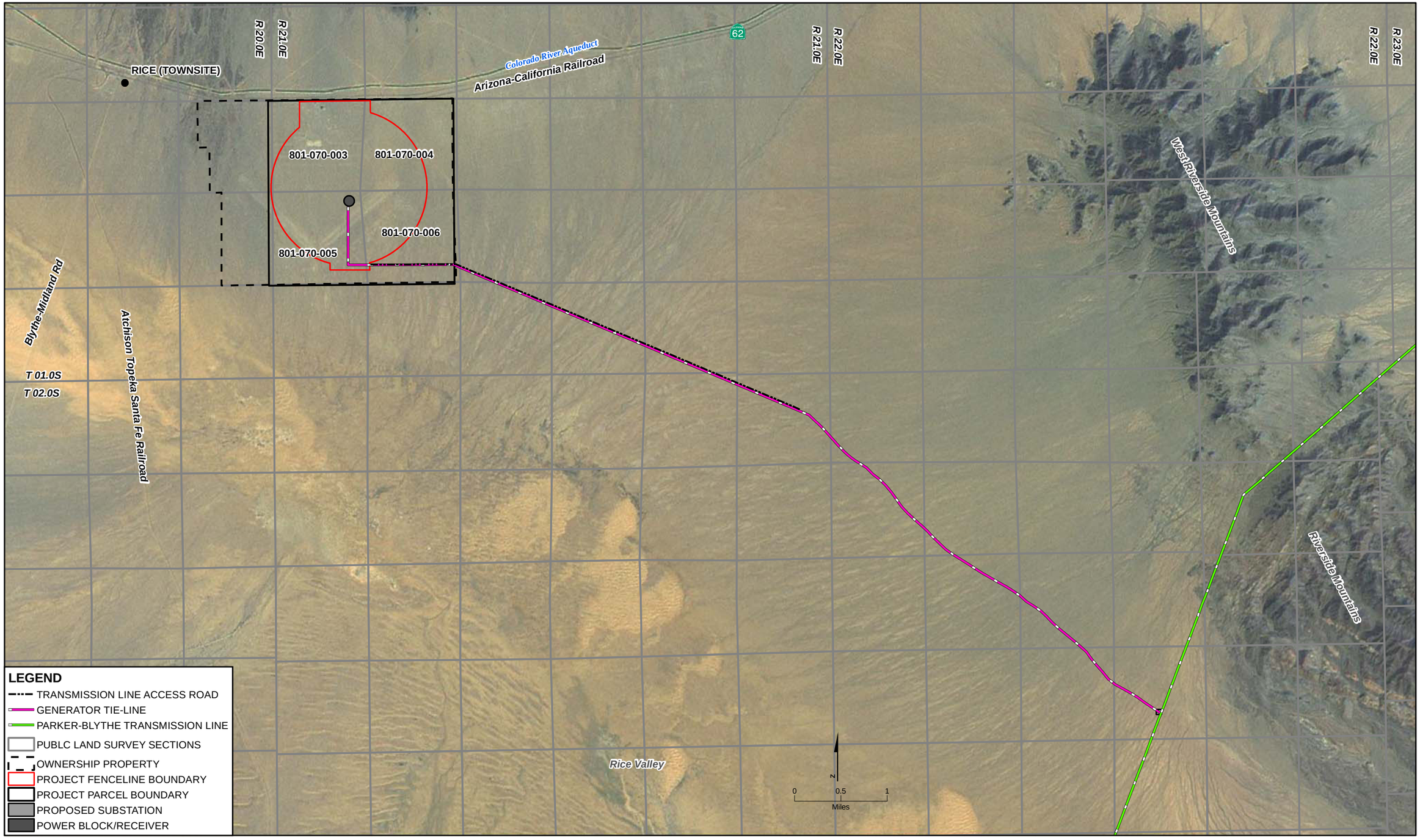
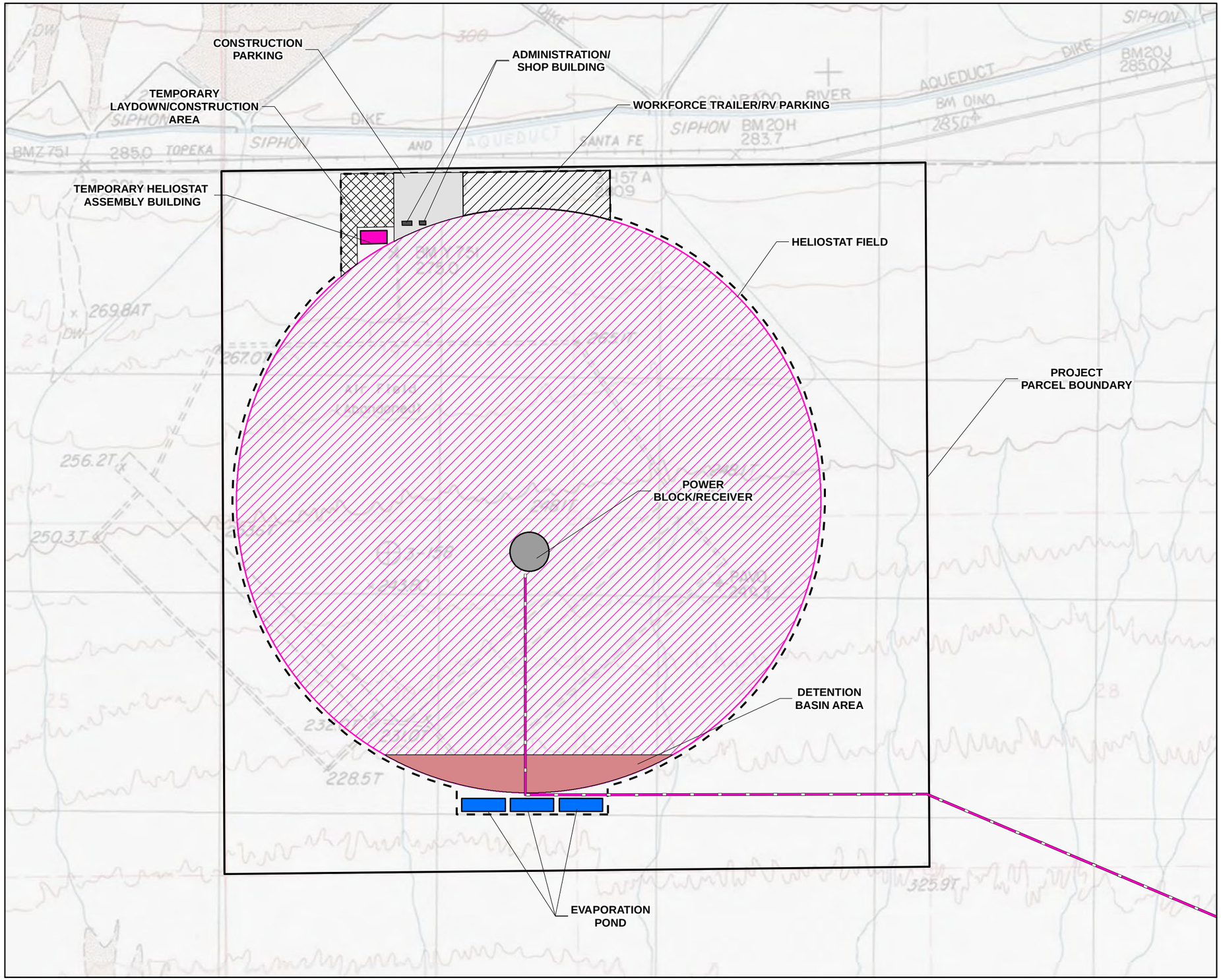
EY072009005SAC Figure_1.ai 03.22.2010 tdaus



This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

FIGURE 2
SITE LOCATION
Rice Solar Energy Project
DESCP



LEGEND

- GENERATOR TIE-LINE
- ADMINISTRATION/SHOP
- CONSTRUCTION PARKING
- DETENTION BASIN AREA
- EVAPORATION POND
- PROJECT FENCELINE BOUNDARY
- HELIOSTAT FIELD
- PROJECT PARCEL BOUNDARY
- POWER BLOCK/RECEIVER
- TEMPORARY HELIOSTAT AREA
- TEMPORARY LAYDOWN/CONSTRUCTION AREA
- WORKFORCE TRAILER/RV PARKING

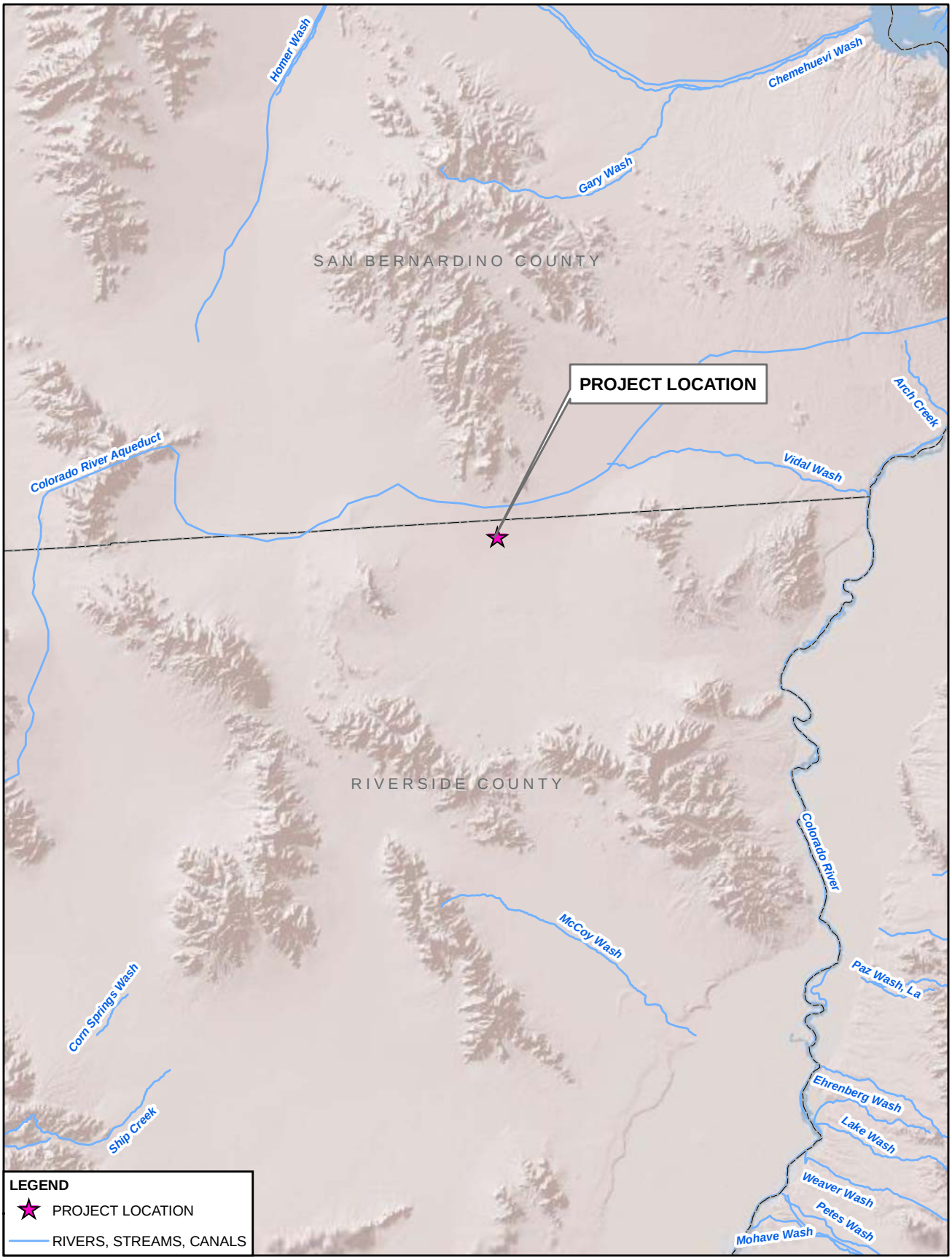
This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

N

0 750 1,500
Feet

FIGURE 3
DETAILED SITE PLAN
Rice Solar Energy Project
DESCP

CH2MHILL



Notes:
1. U.S Geological Survey along with U.S Environmental Protection Agency, 2006.

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

N

0 4 8
Miles

FIGURE 4
SURFACE WATER FEATURES
Rice Solar Energy Project
DESCP

CH2MHILL

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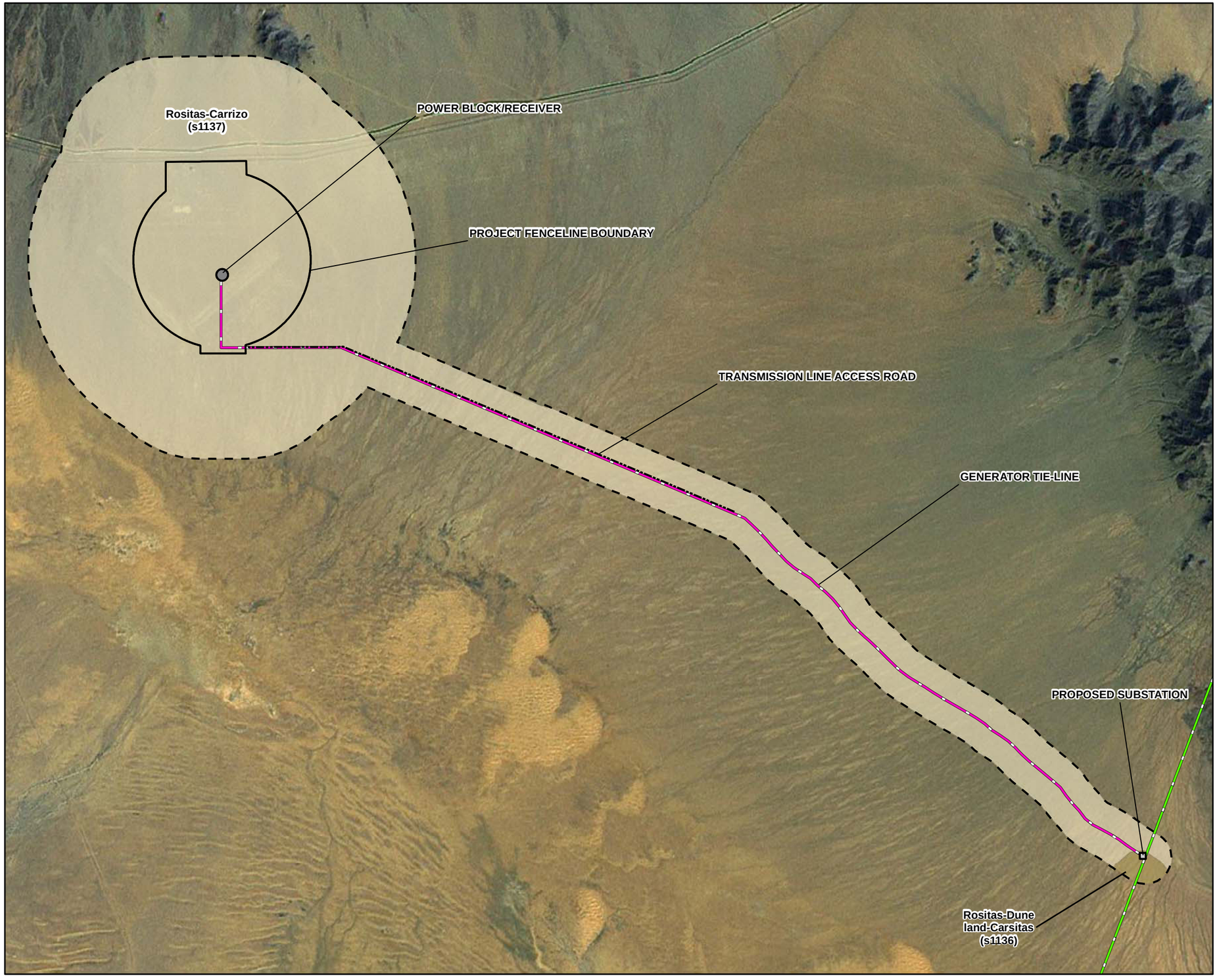
EY072009005SAC Figure_4.ai 03.22.2010 tdaus



LEGEND

- TRANSMISSION LINE ACCESS ROAD
- GENERATOR TIE-LINE
- PARKER-BLYTHE TRANSMISSION LINE
- PROJECT FENCELINE BOUNDARY
- PROPOSED SUBSTATION
- POWER BLOCK/RECEIVER
- BUFFER

SOIL TYPE

- ROSITAS-CARRIZO (S1137)
- ROSITAS-DUNE LAND-CARSITAS (S1136)

Notes:
1. 1 Mile around the Project Site and 1/4 mile around the Proposed Transmission Line.
2. Source: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. U.S. General Soil Map (STATSGO2) for Riverside County, California. Available online at http://soildatamart.nrcs.usda.gov accessed August, 07, 2009.

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

N

0 2,500 5,000
Feet

FIGURE 5
SOIL MAP
Rice Solar Energy Project
DESCP

Photo A: Taken from the SR-62, Looking South into the RSEP

FLOW FROM UPSTREAM WATERSHED (4,253 ACRES)
CROSSING THE RAILROAD, AQEDUCT AND STATE ROUTE 62

62

BREACHING OF THE EXISTING DIKES

EXISTING STORMWATER SHEET FLOW PATH DOES ENTER THE PROJECT SITE

EXISTING STORMWATER SHEET FLOW PATH DOES NOT ENTER THE PROJECT SITE

PROPOSED CHANNEL AND ELEVATED ROAD SYSTEM AROUND THE NORTHERN PORTION OF THE PROJECT SITE TO CAPTURE ANY UPSTREAM RUN OFF ~ DAYLIGHT BACK INTO SHEET FLOW THROUGH RIP RAP SYSTEM AT OUTLET

OUTLET FROM THE EXISTING BERM

ELEVATED ROAD AROUND THE HELIOSTAT\ FIELD

OWNERSHIP BOUNDARY

SHEET FLOW

SHEET FLOW

DETETION BASIN OUTLETS

DOWN TO RICE VALLEY DRY PLAYA

N

NOT TO SCALE

Source: Google Earth, 2009
Photos from B.Anders, Rice Solar Energy Project Site Visit 2008

RICE SOLAR ENERGY LLC RICE SOLAR ENERGY PROJECT		WorleyParsons resources & energy
DRAINAGE SCHEME EXHIBIT	10/2009 JF	**3**

FIGURE 6
DRAINAGE SCHEME EXHIBIT
Rice Solar Energy Project
DESCP

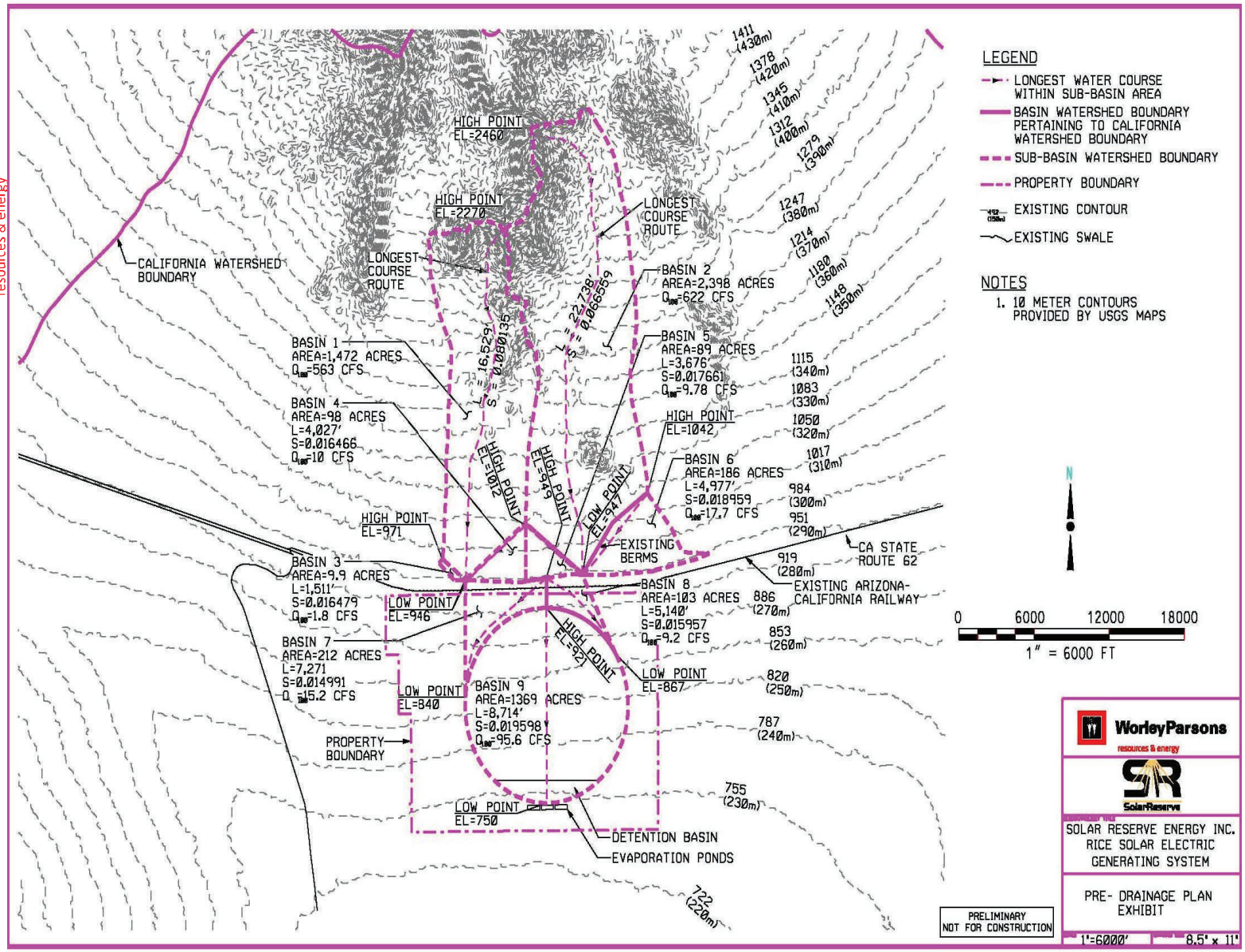


FIGURE 7
PRE-PROJECT DRAINAGE
Rice Solar Energy Project
DESCP

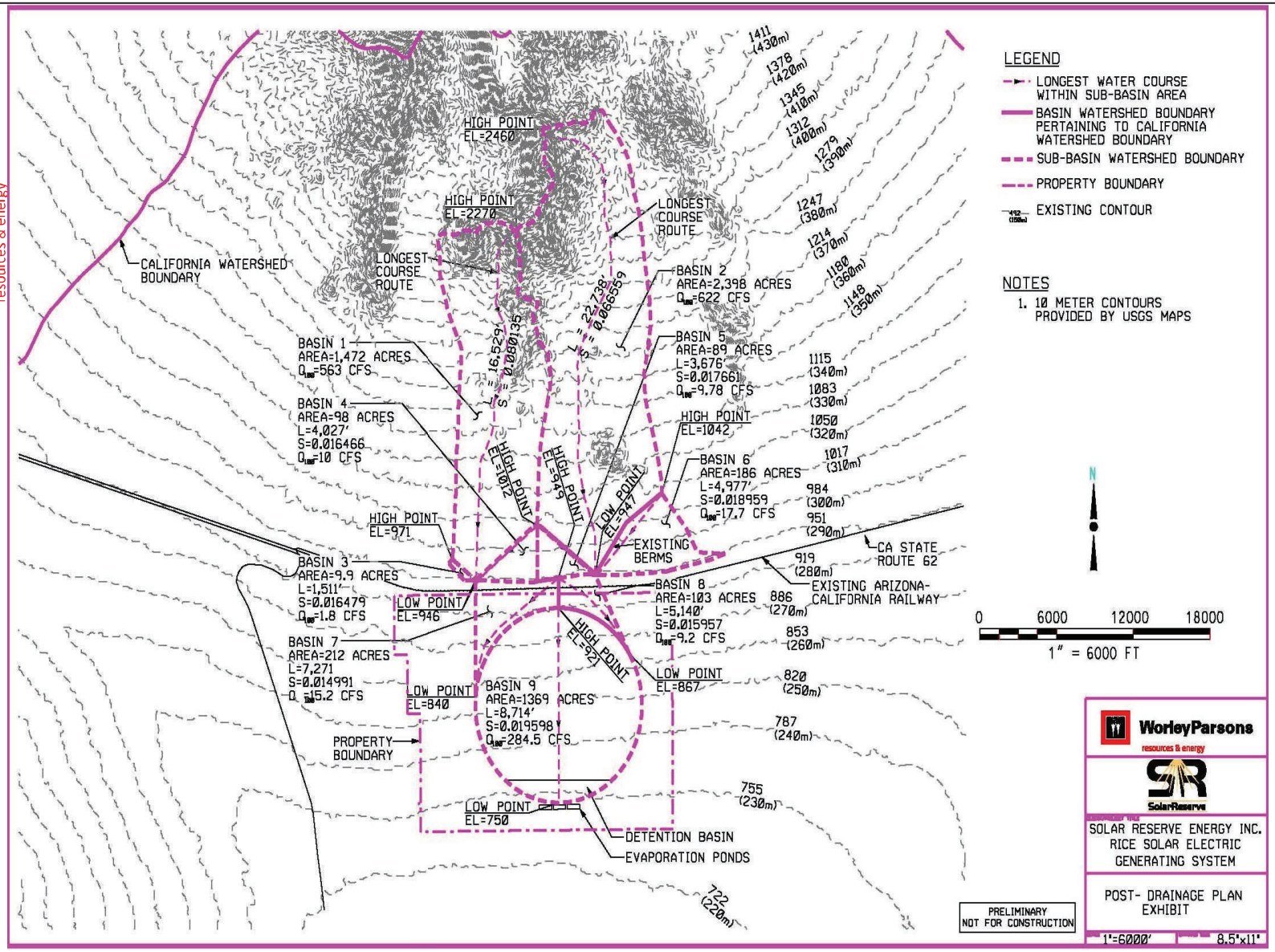
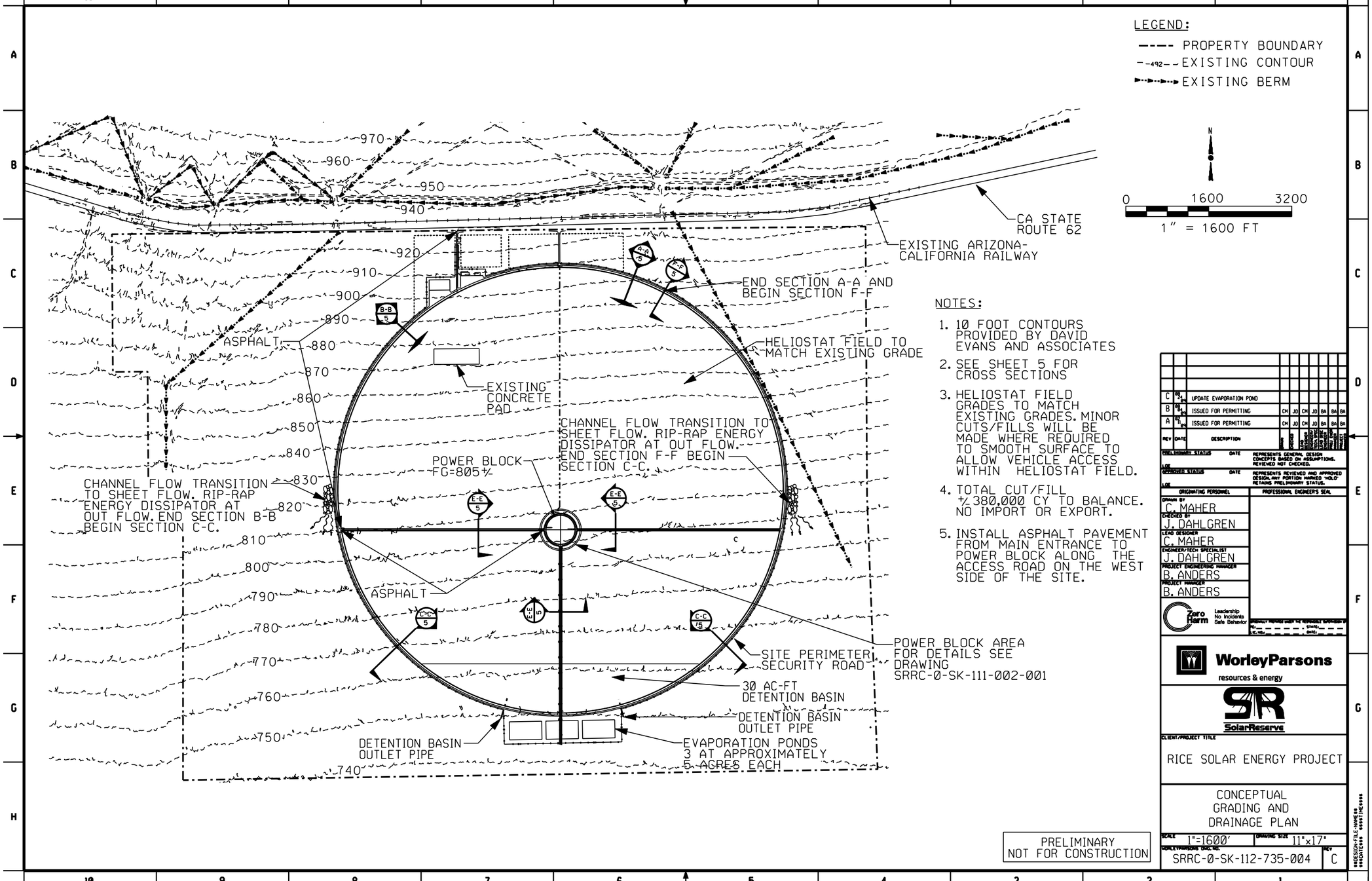


FIGURE 8
POST-PROJECT DRAINAGE
Rice Solar Energy Project
DESCP



NOTES:

1. 10 FOOT CONTOURS PROVIDED BY DAVID EVANS AND ASSOCIATES
2. SEE SHEET 5 FOR CROSS SECTIONS
3. HELIOSTAT FIELD GRADES TO MATCH EXISTING GRADES. MINOR CUTS/FILLS WILL BE MADE WHERE REQUIRED TO SMOOTH SURFACE TO ALLOW VEHICLE ACCESS WITHIN HELIOSTAT FIELD.
4. TOTAL CUT/FILL ±380,000 CY TO BALANCE. NO IMPORT OR EXPORT.
5. INSTALL ASPHALT PAVEMENT FROM MAIN ENTRANCE TO POWER BLOCK ALONG THE ACCESS ROAD ON THE WEST SIDE OF THE SITE.

REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/TECH SPECIALIST	PROJECT ENGINEERING MANAGER	PROJECT MANAGER
C	08/31/09	UPDATE EVAPORATION POND	CM	JD	CM	JD	BA	BA
B	08/19/09	ISSUED FOR PERMITTING	CM	JD	CM	JD	BA	BA
A	07/31/09	ISSUED FOR PERMITTING	CM	JD	CM	JD	BA	BA

PRELIMINARY STATUS — DATE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
APPROVED STATUS — DATE — REPRESENTS REVIEWED AND APPROVED DESIGN, ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
ORIGINATING PERSONNEL — PROFESSIONAL ENGINEER'S SEAL

DRAWN BY: C. MAHER
CHECKED BY: J. DAHLGREN
LEAD DESIGNER: C. MAHER
ENGINEER/TECH SPECIALIST: J. DAHLGREN
PROJECT ENGINEERING MANAGER: B. ANDERS
PROJECT MANAGER: B. ANDERS

Zero Harm — Leadership, No Incidents, Safe Behavior

WorleyParsons resources & energy

SolarReserve

CLIENT/PROJECT TITLE
RICE SOLAR ENERGY PROJECT

CONCEPTUAL GRADING AND DRAINAGE PLAN

SCALE 1"=1600' | DRAWING SIZE 11"x17"
WORLEYPARSONS DWG. NO. SRRC-0-SK-112-735-004 | REV C

PRELIMINARY NOT FOR CONSTRUCTION

SRRC-0-SK-112-735-004.dgn 8/31/2009 12:50:49 PM

FIGURE 9A
CONCEPTUAL GRADING AND DRAINAGE PLAN
Rice Solar Energy Project
DESCP

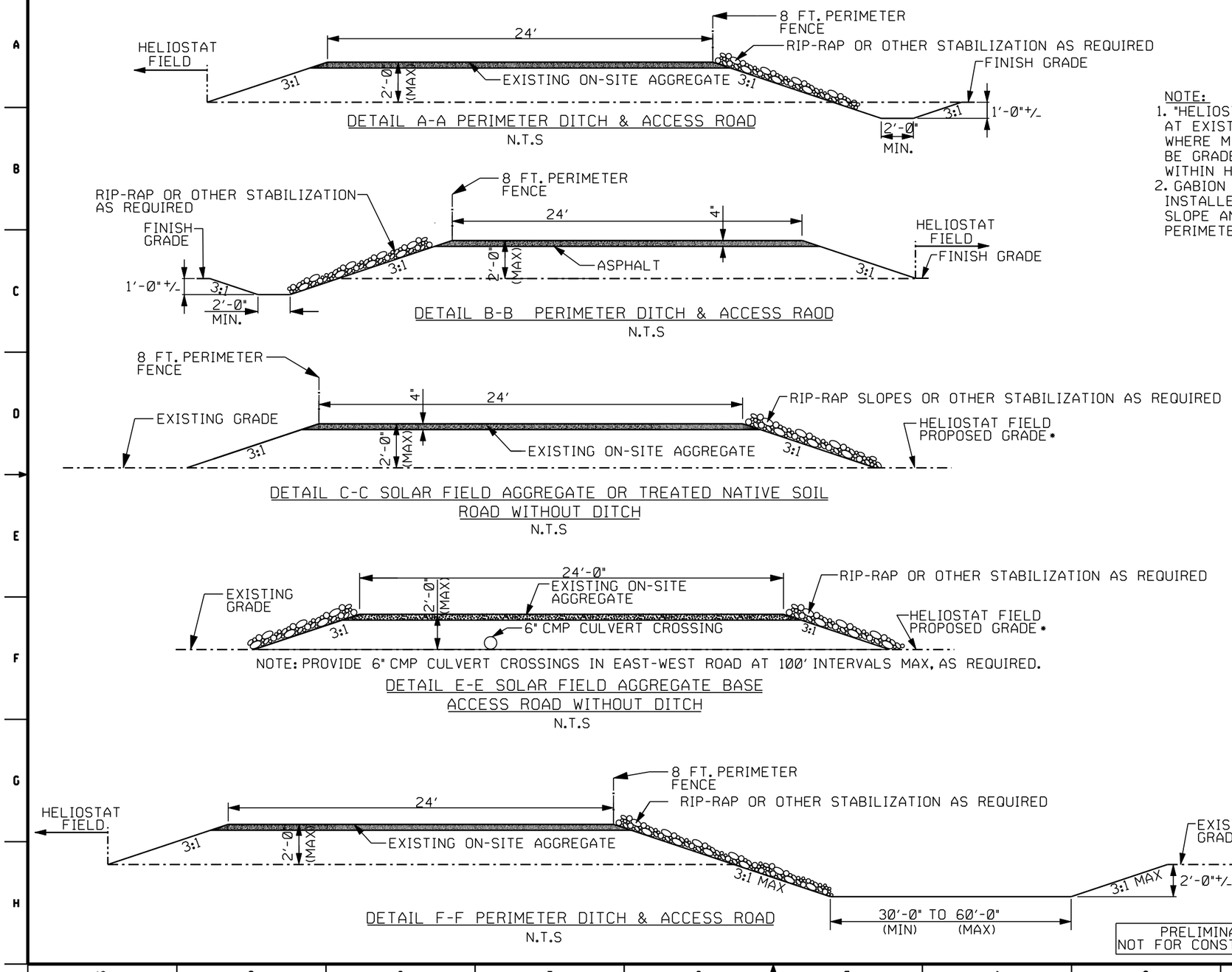


FIGURE 9B
CONCEPTUAL GRADING AND DRAINAGE PLAN
Rice Solar Energy Project
DESCP

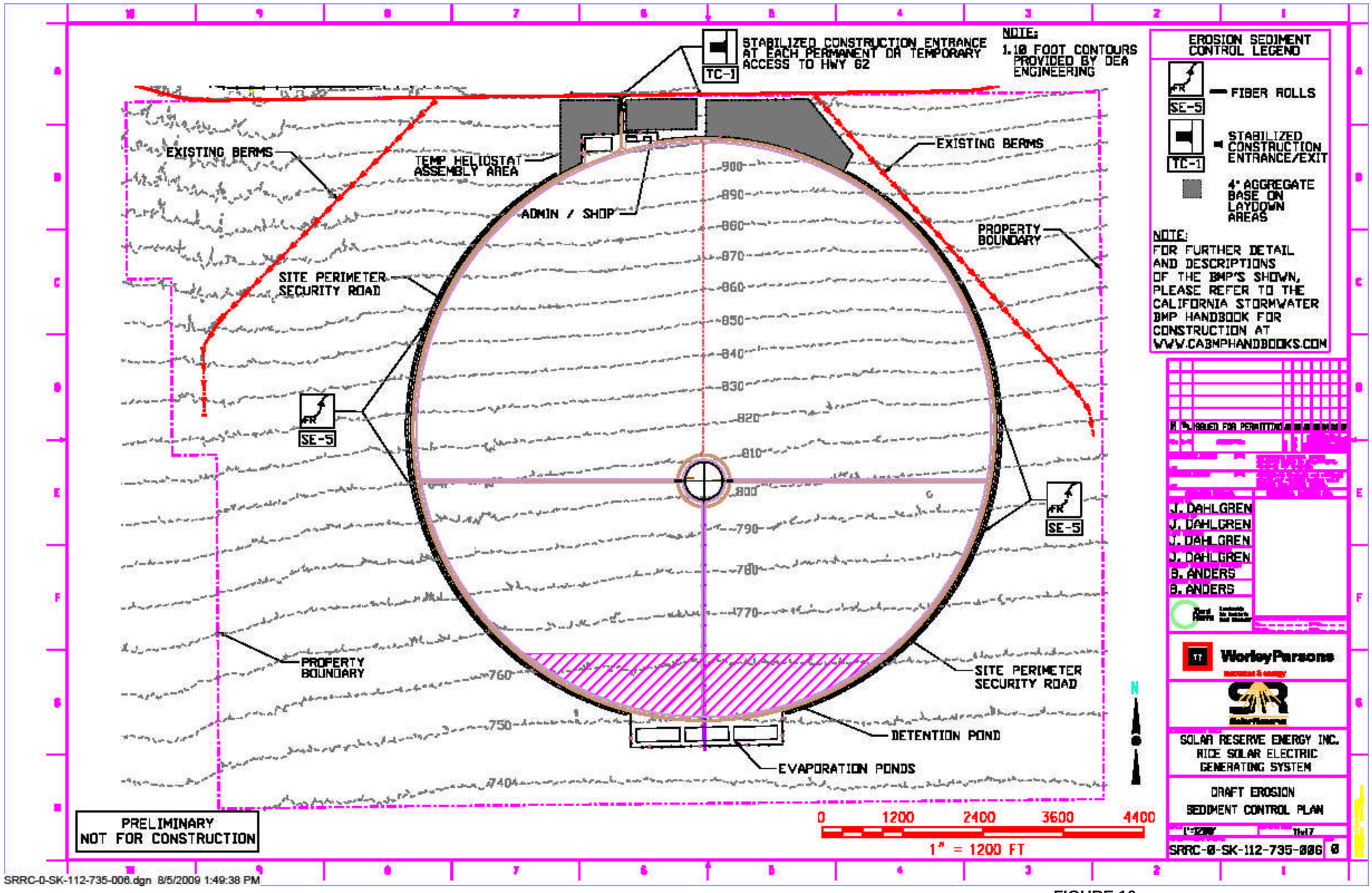


FIGURE 10
DRAFT EROSION SEDIMENT CONTROL PLAN
Rice Solar Energy Project
DESCP

Attachment
Preliminary Drainage Study

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RICE SOLAR ENERGY PROJECT

CONCEPTUAL DRAINAGE STUDY

RIVERSIDE COUNTY

CALIFORNIA

Prepared By:

WorleyParsons Group, Inc.

October 9th 2009

WorleyParsons
resources & energy

NOTICE

The information presented in this document was compiled and interpreted exclusively for the purposes of a conceptual drainage study for Rice Solar Energy Project. WorleyParsons provided this report for Rice Solar Energy, LLC for the purpose noted above.

WorleyParsons has exercised reasonable skill, care, and diligence to assess the information acquired during the preparation of this report, but makes no guarantees or warranties as to the accuracy or completeness of this information. The information contained in this report is based upon, and limited by, the circumstances and conditions acknowledged herein, and upon information available at the time of its preparation. The information provided by others is believed to be accurate but cannot be guaranteed.

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RICE SOLAR ENERGY PROJECT

REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
0	Issued for Use	J Dahlgren	B. Anders	B. Anders	05-Aug-09	N/A	
1	Issued for Use	J Forrest	B. Anders	B. Anders	09-Oct-09	N/A	

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FIGURES

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I. PROJECT LOCATION

Rice Solar Energy, LLC, an affiliate of Solar Reserve, LLC, (herein "Rice Solar Energy LLC" or "Applicant") proposes to construct, own, and operate a solar electrical generating plant on a 3,324 acre parcel of land ("Property") in an unincorporated area of eastern Riverside County, California, situated immediately south of State Route (SR) 62 at milepost 109 (refer **Figure 1** and **2**). The Rice Solar Energy Project (herein "RSEP" or "Project") will occupy 1,410 acres ("Site") of the Property, with solar thermal power generating technology which includes solar tracking heliostats that reflect solar energy to a central receiver, mounted on a tower.

The RSEP site is located in a very sparsely settled portion of the Colorado Desert, a sub region of the Sonoran Desert. Access to the RESP site will be directly off SR-62. The RSEP site is surrounded by private land to the west and north, and uninhabited public lands managed by the Bureau of Land Management (BLM) to the east and south. SR-62, a railroad operated by California-Arizona Railroad, and the Colorado River Aqueduct, operated by the Metropolitan Water District of Southern California (MWD), are located just north of the RSEP site in San Bernardino County. The Property is presently zoned for Natural Assets (N-A), and Controlled Development Area (W-2) according to Riverside County Zoning Ordinance (Ordinance 348). The Site will be located within the W-2 zoning area.

A crossroads settlement known as Rice was once located just west of the RSEP site, at the junction of SR-62 with Blythe-Midland Road but has been abandoned and little remains. The nearest residence and permanent settlement to the RSEP is Vidal Junction which is 14.8 miles east-northeast (15.4 miles by road) at the junction of SR-62 and US Route 95. The nearest residence and permanent settlement to the west of the RSEP is Iron Mountain Pumping Plant operated by MWD, where there are several residences. The Iron Mountain Pumping Plant is located 17.8 miles west-northwest of the RSEP site (20.9 miles by road).

During World War II, the RSEP site was part of the Desert Training Center (DTC) complex (also known as the California-Arizona Maneuver Area or CAMA) of airfields and military training camps and used as a training airfield, Rice Army Airfield, between 1942 and early 1944. The airfield was closed by the military in August 1944, but used privately during the 1950s, and then abandoned sometime before 1958.

The Property is situated south of the Turtle Mountains within the broad Rice Valley and has a very slight slope (less than 2% overall). The RSEP site is located at approximately 750 to 920 feet above mean sea level (amsl) and has gently sloping southerly facing slope on the lower portions of alluvial fans that emanate from the Turtle Mountains (refer **Figure 2**). The elevation of the valley floor within Rice Valley is approximately 675 feet amsl. The general landscape in the vicinity of the RSEP site is creosote bush scrub. There are sand dunes known as the Rice Valley Dunes to the south of the RSEP site which formerly contained the "Rice Valley Dunes Off-Highway Vehicle Recreation area." However the BLM closed this

area due to lack of use and potential risk of encountering unexploded ordinance left from the use of Rice Army Airfield as part of the DTC.

Stormwater runoff occurs primarily during thunderstorms and the surface runoff from the mountains drains towards the center of the valley, except in the eastern part of the valley, where Big Wash drains to the Colorado River. There are no perennial streams in the planning area and most of the moisture from rain is lost through evapotranspiration.

The RSEP footprint including the utility lines lies entirely within an area designated by the Federal Emergency Management Agency (FEMA) as Zone D (refer **Section VII** and **Appendix A**).

Off-site stormwater flows originate from an area north of SR-62, the Arizona-California Railroad, and the Colorado River Aqueduct. As the railroad and aqueduct parallel the highway (east west) small dikes have been constructed to control the flow of water across these features (north to south). The dikes direct the offsite flows from the north to specific channels/culverts over the aqueduct, under the railroad and then across SR-62 through small "dips" in the roadway. Due to the type of terrain, the minor slopes, and the offsite flows being isolated, the storm water management dose not pose a significant concern.

II. PROJECT DESCRIPTION

Rice Solar Energy LLC is proposing to develop a net 150-megawatt (MW) solar thermal power generating project with integral thermal storage, a central receiver tower, and a tracking heliostat field. In this process, reflected solar energy heats molten salt (a mixture of sodium nitrate and potassium nitrate) in the central receiver tower. The molten salt acts as a heat transfer medium, capturing solar energy and conveying it to a large insulated thermal storage tank. Molten salt is pumped from the tank through a series of heat exchangers which produce utility-grade steam from water and drives a conventional steam turbine which turns an electrical generator. The salt is stored in molten form with little loss of the sun's energy, so the RSEP facility can generate electricity at any time, including during nighttime or on cloudy days.

The solar thermal technology will provide 100 percent of the power generated by the RSEP; no supplementary energy source (e.g. natural gas to generate electricity at night) is proposed to be used for electric energy production. Rice Solar Energy LLC proposes to use dry cooling technology (air-cooled condenser) for power plant cooling. Raw process water will be supplied from two onsite groundwater wells, and will be treated and used for steam-cycle makeup, heliostat washing, boiler blowdown and other domestic needs.

A short transmission line is proposed to be constructed from the Site to the south east, across BLM managed land, to an existing 161kV/230kV Western Transmission Line.

Over the majority of the Site no grading will be required. The only areas of nominal grading will be the power block, which will be graded to create a generally uniform elevation for construction of the plant power island facilities, the roads and associated ditches, and the detention and evaporation pond areas. The heliostats can be installed without grading except in locations where minor grading will be required to provide a smooth surface for truck access. It is expected that any grading within the heliostat field will be completed with cuts and fills of less than 6 inches. Vegetation within the heliostat area will be cut or removed only as needed to allow installation of the heliostats. The root structure of vegetation will be allowed to remain to enhance soil stability and to facilitate potential re-growth. **Photo 1** shows the typical existing surface and vegetation and was taken at the location of Test Pit 12 (Identified as B-12 in the "Preliminary Geotechnical Engineering Report, dated August 5, 2009, by Terracon) which is located within the west half of the proposed heliostat field.

Photo 1: Typical existing surface and vegetation

As outlined in **Section I,** off-site storm water flows are sourced from an area north of SR-62, the California-Arizona Railroad and the Aqueduct. There is one dike immediately east of the Site and another dike immediately west of the Site, therefore the drainage sheds associated with flows need to be addressed in the design of the Site.

Based on site visits and a review of aerial photos it is known that the off site storm flows have been redirected south of SR-62 in the past (refer **Figure 3**). Small dikes were constructed to divert off site flows around the air field. These small dikes can be seen in aerials and the redirected flows show up on USGS Maps of the area (refer **Figure 2** and **3**). These small dikes divert(ed) off site flows to the east and west of where these off site flows cross SR-62. Over time, and because of a lack of maintenance, these dikes have been breached and a portion the off site storm flows have returned to sheet flow after crossing SR-62.

For development of the Site, small ditches will be constructed on the outside of the Site, along the perimeter of the north portion of the heliostat field to direct these off site flows around the Site. The ditches, along with the elevated perimeter road will be the features that redirect the off site flows around the heliostat fields, similar to the dikes historically constructed in the early 1940's which also directed off site flows around the airfield. The ditches have been sized to contain the stormwater runoff in a 100 year, 24 hour storm event.

On-site storm water run off within the heliostat field will be allowed to sheet flow along its current drainage pattern, from north to south. In the southern portion of the heliostat field, an expansive and shallow detention basin will be constructed to detain any increase in storm

flows, and to allow a location for sediment control. The detention basin shall attenuate the post developed 100 year, 24 hour storm event run off, and discharge at the pre developed 100 year, 24 hour storm event flow rate.

Conceptual grading plans and designs of the roads and ditches are included in Attachment F. Detailed design of the roads, ditches, detention basin and other facilities will be included with the final drainage design.

III. OBJECTIVE

The hydrologic and hydraulic conditions associated with the development of approximately 1,410 acres for the Project are conceptually addressed in this study.

This conceptual drainage study addresses existing drainage patterns associated with pre-developed conditions and the future post development drainage flows through and around the Site. The objective of the study is to ensure the solar power plant development does not impact on the downstream drainage system and properties. This objective was achieved by undertaking the follow activities:

- Determine the drainage watershed boundary for the Project site (including off-site sources);
- Determine the quantity of stormwater run-off entering the Project site;
- Determine the quantity of stormwater run-off within the Project site under pre-developed conditions;
- Determine the quantity of stormwater run-off within the Project site under post-developed conditions;
- Evaluate the difference in stormwater run-off quantities between pre-developed and post developed conditions and estimate the required size of on-site detention basins;
- Determine the alignment and sizing of drainage channels to facilitate off-site stormwater run-off; and

In order to accomplish this, hydrology calculations are performed using TR-55 (SCS Method) to determine the rate of pre and post development stormwater run-on and run-off in the watershed.

The USDA Natural Resources Conservation Service and Riverside Hydrology manual are used to classify soil characteristics, expected soil types and other design criteria necessary for use with the TR-55 calculations. Offsite flows are to be determined using the watershed boundaries from available state watershed information, contour intervals, and available soils mapping information. The watershed is then further broken down into sub-basins as required to determine the flow from off site drainage locations (where the off-site dikes focus the flows) as they approach the Site. Nodes shall be placed at appropriate locations to evaluate the pre and post development stormwater flows, and to ensure that the Site post-development discharge is kept at or below the pre-developed discharge.

IV. DRAINAGE SUMMARY

Drainage modeling and calculations were performed using Bentley PondPack Ver. 10.1. The objective of not exceeding the pre-developed flows at the points of interest were accomplished (refer to **Table 1**). Detention basins shall be designed to ensure that the Site post-development discharge is kept at or below the pre-developed discharge.

Table 1: 100 year, 24 hour Pre Developed and Post Development Flows in Sub-Basin 9

	Pre Developed Flow (cfs)	Post Developed Flow (cfs)
Outlet	96	285
Detention Basin	N/A	To obtain an outlet volume of less than 96 cfs requires a detention basin size estimated at 30 ac-ft

cfs = cubic feet per second

N/A = not applicable

V. HYDROLOGY

The hydrology analysis was performed and analyzed as set forth in the Riverside Hydrology Manual. USDA Natural Resources Conservation Service (NRCS formerly SCS) Technical release 55 (TR-55) is used to assign curve numbers (CN) in calculating runoff. TR-55 is also used to compute time of concentration. Time of concentration is based on sheet flow, shallow concentrate, and channel flow.

As outlined in **Section II**, the Site will predominantly use channels to convey runoff around the Project Site. For large drainage areas, the Riverside County Hydrology Manual requires using the (NRCS/SCS) Unit Hydrograph Methodology for drainage calculation.

A. RAINFALL

In the 100 year, 24 hour storm event, 3.32 inches of rainfall shall fall (refer to **Appendix B**). Based on the Site location, the (NRCS/SCS) Type II rainfall distribution was used when performing calculations.

B. SOILS

Soil classification was made using data from USDA Natural Resources Conservation Service (refer to **Appendix C**). The soil type within the pre-developed watershed and post-developed watershed is listed in **Table 2**.

Table 2: Soil Types

Soil Type	Off-site Watershed Areas (acres)	On-site Basin 9 Pre and Post Development Watershed Area (acres)
A	2074	1369
B	1821	0
C	673	0
TOTAL	**4568**	**1369**

The soil on site is classified as typical durorthids, loamy-skeletal mixed, hyperthermic and shallow, and typical torripsamments, mixed, hyperthermic. A soil list for the watershed is included in **Appendix C**.

C. HYDROLOGIC LOSSES

With the hydrologic soil group established, hydrologic losses can be computed using (NRCS/SCS) runoff curve numbers (CN) found by using TR-55 runoff curve numbers (refer to **Appendix C**). The sub-region and associated curve numbers are input into PondPack, which calculates a weighted CN for the total area to be used for the runoff computations. The hydrologic cover type was assumed to be desert shrub and allocated as "fair" for pre development and "poor" for post development conditions.

D. PRE DEVELOPED CONDITIONS

The pre-developed drainage plans (refer to **Appendix D**) were prepared to estimate the runoff for all drainage areas at the Site. The total watershed area is 5,937 acres, of which 4,568 is off-site. The watershed was divided into eight upstream sub-basins (sub-basin 1, 2, 3, 4, 5, 6, 7 and 8) and one onsite sub-basin (sub-basin 9). The area of each sub basin is shown in **Table 3**.

Table 3: Pre Developed Conditions, Sub-basin Areas

SUB-BASIN NUMBER	**AREA** (Acre)
1	1,472
2	2,398
3	10
4	98
5	89
6	186
7	212
8	103
9	1,369

Drainage was estimated using USGS quadrangle maps. It is assumed that flows are unimpeded at all crossings structures that exist. This assumption is conservative because it does not take into account any storage or reduction in peak flows that may be associated with an undersized crossing structure.

The calculations of the 100 year, 24 hour storm flows under pre-developed conditions for off-site and on-site areas are summarized in **Appendix D**. The 100 year, 24 hour storm flows

were calculated using PondPack software. The software generates required runoff hydrographs for each of the drainage area separately, rainfall distribution used in this calculation is Type II 24 hour rainfall and the 100 year rainfall events were obtained from NOAA Atlas 2 Rainfall Depth – Duration – Frequency Maps reproduced for the Riverside area (refer to **Appendix B**).

E. POST DEVELOPED CONDITIONS

The post-developed drainage plans are located in **Appendix E**. The total watershed area under post-developed conditions is approximately 1,369 acres (sub-basin 9 only). As outlined in **Section II**, flows from offsite shall be diverted in two channels that flow around the perimeter of Basin 9:

- Flows from sub-basin 7 will be diverted through a drainage channel on the west side perimeter of sub-basin 9 and will eventually turn back into sheet flow at an outlet past sub-basin 9.
- Flows from sub-basin 8 will be diverted through a drainage channel on the east side perimeter of sub-basin 9 and will eventually turn back into sheet flow at an outlet past sub-basin 9.
- Flows from sub-basins 1-6 will be diverted into existing channels and berms on the east and west side of sub-basin 9, that will route the flow back to sheet flow at outlets past the perimeter of Basin 9.

In addition, a detention basin has been included in the model to capture all run off from sub-basin 9. The sub areas for post developed conditions are shown in **Table 4**.

Table 4: Post Developed Conditions, Sub Basin Areas

SUB-BASIN NUMBER	**AREA** (Acre)
9	1,369
TOTAL	**1,369**

There is an increase in impervious area on Site due to:

- Paved Access Roads (around the Site and connecting to off-site existing roadways);
- Administration Building;
- Warehouse; and

- Power Block Concrete surfacing.

It has been assumed that each of the heliostats will freely drain onto the ground. The ground surface may be slightly more impervious in post developed conditions due to the footings of the heliostats.

The calculations of the 100 year, 24 hour storm event flows under post-developed conditions are summarized in **Appendix E**. The 100 year storm flows were calculated using PondPack software. The preliminary volumes required for the detention basin is 30 acre-feet for sub-basin 9. Further specifics for the detention pond (i.e. outlet design, risers, and spillway structures) shall be undertaken during detailed design, occurring in a later phase of this project.

VI. HYDRAULICS

A. SUMMARY

Channels were designed using open channel flow criteria.

B. DESIGN CONSIDERATIONS

1. DESIGN STORM FREQUENCY

100 year, 24 hour event with the water surface contained within all channels.

2. DESIGN STORM DURATION

The goal in the storm drain design is to convey the maximum peak flow for a given design storm. This involves choosing a storm with the same duration as the time-of-concentration for the watershed (critical duration). As the storm is passed down the collection system, the time-of-concentration at each point downstream of the headwater sheds will increase according to shed minimum time-of-concentration plus travel time in structures.

3. MINOR LOSSES

A Manning's roughness coefficient n value of 0.020 was assumed for the channels.

4. VEGETATION, CLEARING, AND GRUBBIING

The site's natural vegetation will remain in place and undisturbed throughout the Property, and will only be disturbed or removed within the limits of the Site as needed to construct the facilities. As discussed in **Section II**, grading will be limited to that required to generate a smooth surface within the heliostat field. Vegetation will be cut or removed as needed, but root structures will be left in place where possible (i.e. no grading is required). A concerted effort will not be employed to "grub" the root system of the onsite vegetation.

5. GRADING, EXCAVATION, AND SLOPES:

Only portions of the Site (the heliostat field) will be lightly graded to create a relatively smooth condition. Localized areas where abrupt changes of grade occur will be graded to allow for vehicle access within the heliostat field. Nominal grading will be required to elevate the roads, cut the ditches, build the evaporation ponds, and to level the power island location. Slopes will be a maximum of 3H:1V, and will be flatter where possible to allow vehicle access from and to road shoulders, and across ditches. The site will not

generate excess soil, nor require import. The site will be graded to balance by generation of needed material within the heliostat field or by very minor fills within the heliostat field.

C. CROSS SECTIONS

Preliminary channel cross sections are shown on the Conceptual Grading Plan (refer to **Appendix F**). The width and depth of the channels vary depending on location. Further specifics for the channels (i.e. individual cross sections, material selection, compaction, stabilization) shall be undertaken during detailed design, occurring in a later phase of this project.

VII. FLOOD MANAGEMENT

As outlined in **Section I**, FEMA has not mapped the Project site for the presence of flood plains (allocated as Zone D on FIRM Map *Number 06065CIND2A Sheet 2, Site is in Grid *06065C0575G, which equates to an area with possible but undetermined flood hazards as no analysis for flood hazards has been conducted) (*refer **Appendix A**). The RSEP site is not located in a flood hazard area identified in the Riverside County General Plan Safety Element.

As outlined in **Section II**, there are two existing dikes that direct upstream stormwater run off towards the RSEP site (refer **Figure 3**). In a 100 year storm event, the upstream stormwater would flow across SR-62 (dips in the road are approximately 40 to 60 feet wide), breach the degraded berms and sheet flow until it either infiltrated into Rice Valley Groundwater Basin, or drained in the Rice Valley dry playa, located approximately 2 miles south of the Project site.

Under developed conditions, upstream stormwater would continue to flow across SR-62 and sheet flow across the land. As shown on **Figure 3**, sheet flow from the west does not currently flow toward the Site, Therefore, the ditch along the north western perimeter of the Site has been sized to contain stormwater run off from the off-site catchment immediately north west of the site (sub-basin 7) (refer to **Appendix F** for proposed cross section). Existing sheet flow to the east of the Site does currently enter the Site, however this stormwater run off will be intercepted in the proposed channel around the north eastern perimeter of the Site. This channel has also been sized to contain the 100 year, 24 hour storm event from the upstream catchment (sub-basins 2, 5 and 6) plus any stormwater run off from the off-site catchment immediately north east of the site (sub-basin 8) (refer to **Appendix F** for proposed cross section).

At the outlet of the proposed channels, the stormwater runoff will transition to sheet flow, through rip rap to act as an energy dissipater. As shown in **Figure 3**, the existing stormwater currently sheets flows from north to south into the Rice Valley dry playa, therefore the outlet of the proposed channel is consistent with the existing conditions.

Additionally, any flow from the 100 year storm event leaving the Project site will be controlled and discharged through the use of the detention basin at flow rates equal to or less than prior to the Project development, negating any effect from the Project site runoff.

All offsite water from the upstream catchment that crosses SR-62 and hits the Site will be contained within the proposed channels and stormwater run-off will be routed around the Project site for the purposes of project design. Implementation of this design approach will protect the project and its components from storm/flood flows, as there are no existing flood hazards mapped, flood flows are controlled north of the site (railway line and aqueduct act as an embankment), cross SR-62 through defined dips in the roadway, and either spread out to a broad, shallow, sheet flow which does not impact the Site (on the west side of the Site) or are captured in a ditch (similar to how the flows were controlled historically), routed around the site, and allowed to spread out to a broad shallow sheet flow south of the Site.

It is noted that that Rice Valley is dominated by surface sand and storm flows have never been reported to accumulate or pond within the valley, indicating a lack of flood hazard potential from the south. As discussed above, the railroad and aqueduct block off-site flow from reaching the site from the north, and concentrate these flows at specific controlled locations, one of which has flows that do not reach the Site (the west side). The concentrated flow on the east side, that will reach the site, will be captured in the perimeter drainage ditch and elevated perimeter road system, and routed around the site. Therefore, it is appropriate to ensure the 100 year flows are contained within this ditch during detailed design of the Project. This can be accomplished be preparing the Hydraulic Grade Line (HGL) of the 100 year storm flow within the diversion channels when the detailed design of these ditches is undertaken. The HGL will be calculated to confirm that the sizing and geometry of the diversion berm and channel system are such that the 100 year storm flows are contained within the diversion channels, passed around the Project site, and dispersed back to sheet flow downstream of the Project Site. This can be undertaken prior to or during detailed design using Bentley Flowmaster or similar software.

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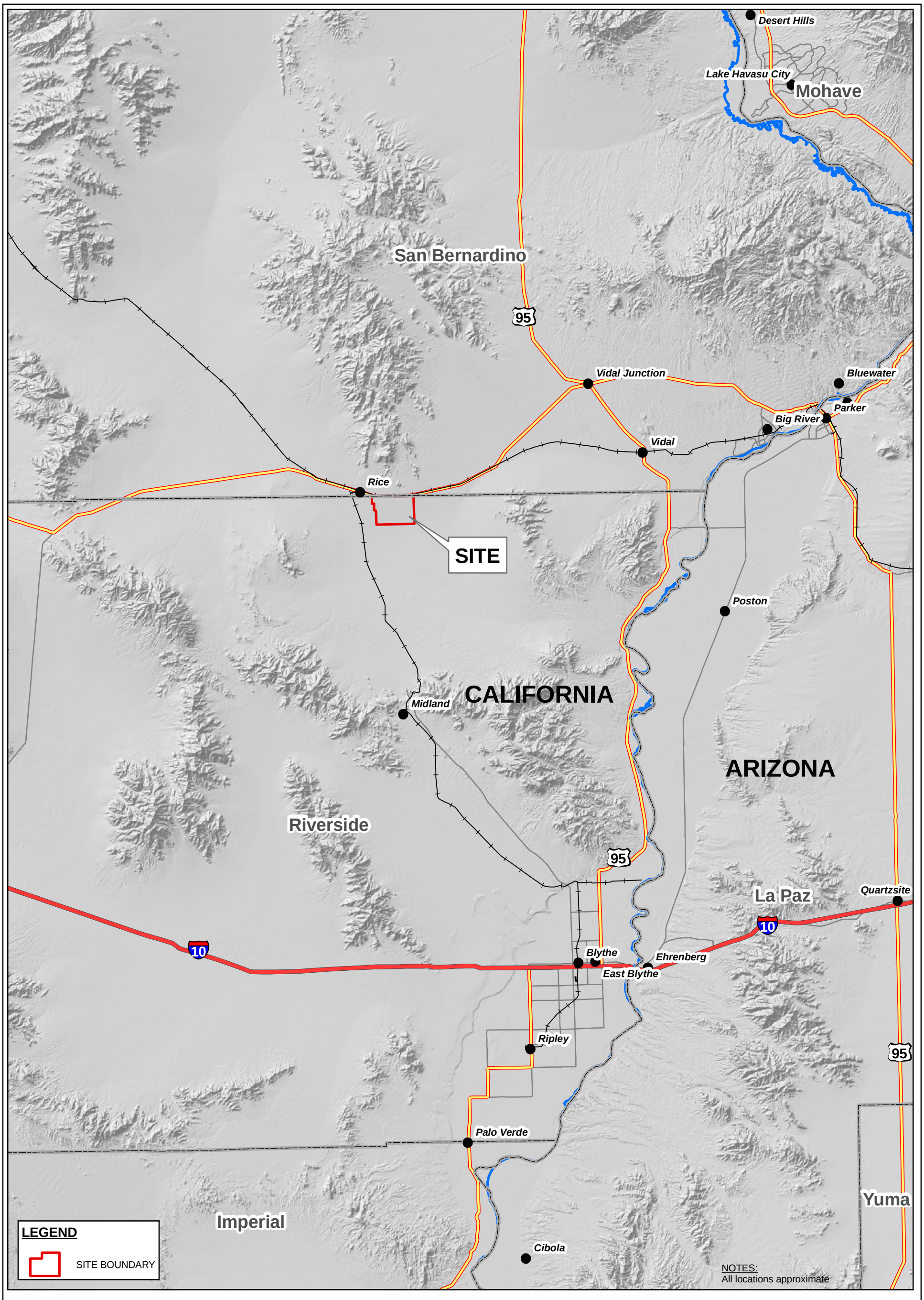
FIGURES



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RICE SOLAR ENERGY, LLC

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PROJECT LOCATION

SWL	NB	2/2009
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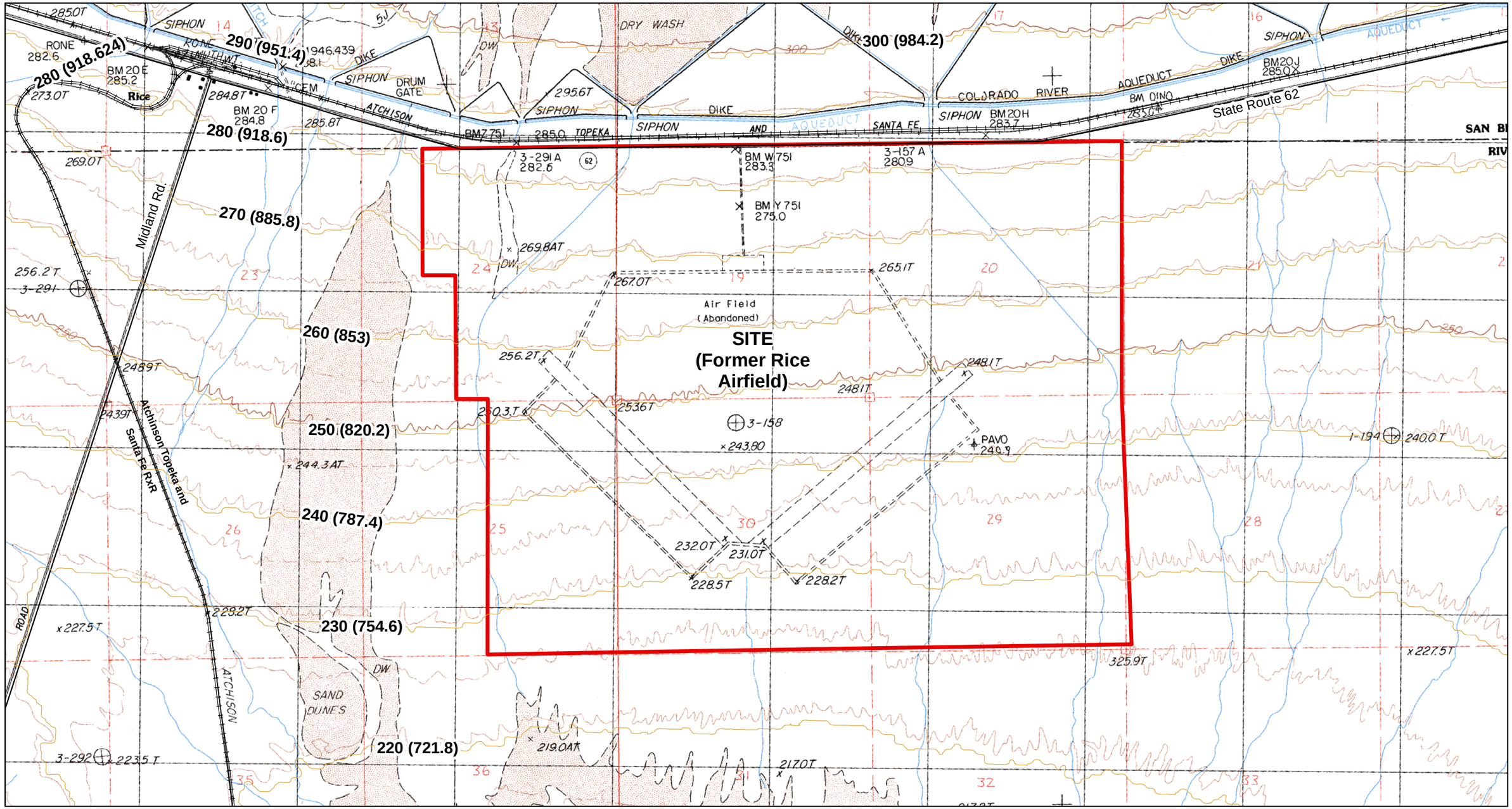

NOTES:
Contours are in Meters and Feet - 220 m (721.8 ft)
SOURCE:
USGS 7.5' Quad Sheet, Rice
All Locations approximate

N
W E
S

0 4,000
Feet

SOLAR RESERVE, LLC

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TOPOGRAPHY MAP

SWL	BA	9/2009
52006711		2

Photo A: Taken from the SR-62, Looking South into the RSEP

FLOW FROM UPSTREAM WATERSHED (4,253 ACRES) CROSSING THE RAILROAD, AQEDUCT AND STATE ROUTE 62

N

62

BREACHING OF THE EXISTING DIKES

EXISTING STORMWATER SHEET FLOW PATH DOES ENTER THE PROJECT SITE

EXISTING STORMWATER SHEET FLOW PATH DOES NOT ENTER THE PROJECT SITE

PROPOSED CHANNEL AND ELEVATED ROAD SYSTEM AROUND THE NORTHERN PORTION OF THE PROJECT SITE TO CAPTURE ANY UPSTREAM RUN OFF ~ DAYLIGHT BACK INTO SHEET FLOW THROUGH RIP RAP SYSTEM AT OUTLET

OUTLET FROM THE EXISTING BERM

ELEVATED ROAD AROUND THE HELIOSTAT\ FIELD

OWNERSHIP BOUNDARY

SHEET FLOW

SHEET FLOW

DETETION BASIN OUTLETS

DOWN TO RICE VALLEY DRY PLAYA

NOT TO SCALE

Source: Google Earth, 2009
Photos from B.Anders, Rice Solar Energy Project Site Visit 2008

RICE SOLAR ENERGY LLC
RICE SOLAR ENERGY PROJECT

DRAINAGE SCHEME EXHIBIT

WorleyParsons
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10/2009	JF	3

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resources & energy

APPENDICES

APPENDIX A – FLOOD MAPS

APPROXIMATE LOCATION OF THE RICE SOLAR ENERGY PROJECT

SAN BERNARDINO COUNTY

*06065C0500G
*06065C0525G
*06065C0550G
*06065C0575G
*06065C0600G
*06065C0625G
06065C0630G 08/28/08
06065C0635G 08/28/08
06065C0640G 08/28/08
06065C0645G 08/28/08
Colorado River Indian Reservation
Colorado River
62
95
*06065C1175G
*06065C1200G
*06065C1225G
*06065C1250G
*06065C1275G
*06065C1280G
06065C1285G 08/28/08
06065C1305G 08/28/08
*06065C1290G
06065C1295G 08/28/08
06065C1960G 08/28/08
*06065C1955G
Colorado River Indian Reservation
*06065C1850G
*06065C1875G
*06065C1900G
*06065C1925G
*06065C1950G
LA PAZ COUNTY, ARIZONA
Paleu Dry Lake
06065C1970G 08/28/08
*06065C1965G
BURLINGTON NORTHERN AND SANTA FE RAILROAD
*06065C2580G
06065C2585G 08/28/08
06065C2605G 08/28/08
95
*06065C2475G
*06065C2500G
*06065C2525G
*06065C2550G
*06065C2575G
Colorado River Indian Reservation
*06065C2590G
06065C2595G 08/28/08
City of Blythe
Ford Dry Lake
10
*06065C3230G
06065C3235G 08/28/08
*06065C3125G
*06065C3150G
*06065C3175G
*06065C3200G
*06065C3225G
06065C3240G 08/28/08
06065C3245G 08/28/08

Chambers

1

NATIONAL FLOOD INSURANCE PROGRAM

MAP INDEX

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA AND INCORPORATED AREAS

(SEE LISTING OF COMMUNITIES TABLE)

MAP INDEX

SHEET 2 OF 2

PANELS PRINTED: 630, 635, 640, 645, 1285, 1295, 1305, 1960, 1970, 2300, 2585, 2595, 2605, 2950, 2975, 3235, 3240, 3245, 3785, 3795, 3805

(SEE SHEET 1 FOR ADDITIONAL PANELS PRINTED)

MAP NUMBER
06065CIND2A

EFFECTIVE DATE
AUGUST 28, 2008

APPENDIX B – RAINFALL PRECIPITATION

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

California 34.065 N 114.8 W 807 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006
Extracted: Tue Feb 17 2009

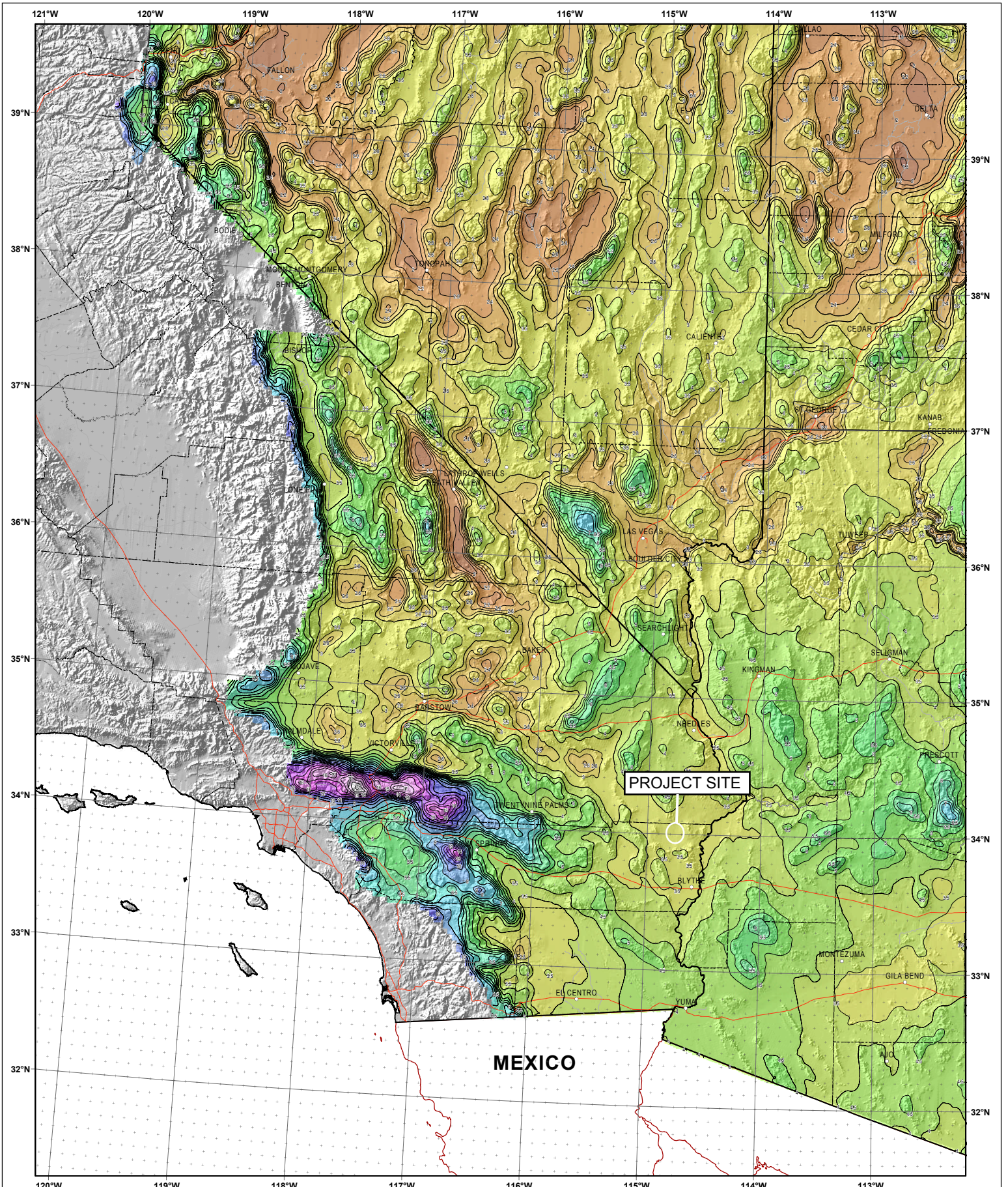
Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.11	0.17	0.21	0.28	0.34	0.42	0.47	0.59	0.70	0.83	0.88	0.98	1.06	1.10	1.25	1.41	1.56	1.71
2	0.15	0.23	0.29	0.39	0.48	0.58	0.65	0.80	0.96	1.10	1.16	1.29	1.40	1.46	1.66	1.88	2.09	2.30
5	0.24	0.37	0.46	0.62	0.77	0.91	1.00	1.21	1.44	1.55	1.63	1.80	1.95	2.05	2.35	2.66	2.98	3.28
10	0.32	0.49	0.61	0.82	1.01	1.19	1.30	1.54	1.81	1.91	1.99	2.20	2.37	2.51	2.87	3.23	3.63	4.00
25	0.44	0.68	0.84	1.13	1.40	1.62	1.75	2.02	2.35	2.42	2.50	2.76	2.95	3.14	3.58	4.00	4.50	4.96
50	0.55	0.84	1.04	1.41	1.74	2.00	2.14	2.44	2.80	2.82	2.91	3.20	3.40	3.65	4.13	4.60	5.17	5.70
100	0.68	1.04	1.29	1.73	2.14	2.45	2.60	2.89	3.28	3.32	3.35	3.67	3.88	4.18	4.71	5.21	5.84	6.46
200	0.83	1.27	1.57	2.12	2.62	2.97	3.13	3.40	3.81	3.84	3.88	4.17	4.39	4.74	5.32	5.83	6.53	7.22
500	1.07	1.64	2.03	2.73	3.38	3.78	3.98	4.25	4.67	4.72	4.77	4.88	5.08	5.53	6.14	6.68	7.45	8.25
1000	1.30	1.98	2.45	3.30	4.09	4.53	4.75	5.03	5.47	5.52	5.58	5.63	5.64	6.15	6.80	7.34	8.16	9.05

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.13	0.20	0.25	0.34	0.42	0.50	0.56	0.69	0.82	0.94	0.99	1.10	1.19	1.25	1.42	1.59	1.77	1.94
2	0.19	0.28	0.35	0.48	0.59	0.69	0.77	0.94	1.12	1.24	1.31	1.45	1.57	1.65	1.88	2.12	2.37	2.60
5	0.30	0.46	0.56	0.76	0.94	1.09	1.19	1.41	1.66	1.75	1.83	2.03	2.19	2.31	2.65	2.99	3.37	3.71
10	0.39	0.60	0.74	1.00	1.24	1.42	1.54	1.80	2.09	2.15	2.23	2.47	2.66	2.82	3.24	3.64	4.10	4.53
25	0.54	0.82	1.02	1.38	1.70	1.93	2.06	2.36	2.72	2.74	2.81	3.09	3.31	3.54	4.04	4.50	5.09	5.62
50	0.68	1.03	1.27	1.72	2.12	2.39	2.53	2.85	3.25	3.28	3.28	3.59	3.83	4.11	4.68	5.18	5.85	6.48
100	0.83	1.27	1.57	2.12	2.62	2.94	3.09	3.40	3.83	3.87	3.91	4.13	4.38	4.73	5.35	5.89	6.64	7.37
200	1.02	1.56	1.93	2.60	3.22	3.59	3.74	4.02	4.47	4.52	4.56	4.72	4.97	5.39	6.06	6.62	7.44	8.28
500	1.33	2.03	2.51	3.38	4.19	4.62	4.82	5.09	5.56	5.62	5.67	5.73	5.80	6.33	7.06	7.64	8.56	9.51
1000	1.62	2.46	3.06	4.12	5.09	5.59	5.82	6.10	6.57	6.63	6.70	6.77	6.83	7.11	7.87	8.47	9.43	10.49

* The **upper** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **greater** than.
** These precipitation frequency estimates are based on a partial duration series. **ARI** is the Average Recurrence Interval.
Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.



SOUTHEASTERN CALIFORNIA

NOAA Atlas 14, Volume 1, Version 4
Semiarid Southwestern United States

Prepared by U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE
OFFICE OF HYDROLOGIC DEVELOPMENT
HYDROMETEOROLOGICAL DESIGN STUDIES CENTER
June 2006

SCALE 1:2,000,000
(when printed/viewed at ANSI C size)
0 10 20 30 40 50 Miles
0 5 10 20 30 40 50 60 70 Kilometers

Isopluvials of 24 hour precipitation (inches) with Average Recurrence Interval of 100 years

See NOAA Atlas 14 documentation for factors to convert to Annual Exceedance Probabilities for all estimates below 25 years

N

Inches

1.53 - 1.60	2.61 - 2.80	5.01 - 5.50	9.01 - 10.00	15.01 - 16.00
1.61 - 1.80	2.81 - 3.00	5.51 - 6.00	10.01 - 11.00	16.01 - 17.00
1.81 - 2.00	3.01 - 3.50	6.01 - 6.50	11.01 - 12.00	17.01 - 18.00
2.01 - 2.20	3.51 - 4.00	6.51 - 7.00	12.01 - 13.00	18.01 - 19.00
2.21 - 2.40	4.01 - 4.50	7.01 - 8.00	13.01 - 14.00	
2.41 - 2.60	4.51 - 5.00	8.01 - 9.00	14.01 - 15.00	

Projection: Lambert Conformal Conic; Datum NAD83; Standard Parallels: 38° and 45°; Central Meridian 112°.

APPENDIX C – SOIL CLASSIFICATION

Curve Number (CN) Determination

The SCS Curve Number Method uses a coil cover complex number (CN) for computing excess precipitation. The CN is related to hydrologic soil group (A, B, C, or D), land use, treatment class (cover), and antecedent moisture condition. The soil group is determined from published soil maps for the area (usually published by the NRCS (SCS))

The definitions of the hydrologic soil groups are:

> *Group A – Low run off potential. Soils having a high infiltration rates even when thoroughly wetted and consisting chiefly of deep, well drained sands or gravels. These soils have a high rate of water transmission.*
>
> *Group B – Soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well drained sandy-loam soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.*
>
> *Group C – Soils having slow infiltration rates when thoroughly wetted and consisting chiefly of silty loam soils with a layer than impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.*
>
> *Group D – High run off potential. Soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very slow rate of water transmission.*

The Hydrologic Soil Classifications were obtained from:

SSURGO – Soil Survey Geographic Data Base U.S. Department of Agriculture, Natural Resources Conservation Service.

Specific Soil taxonomy for the watershed is shown in the following maps.

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RICE SOLAR ENERGY FACILITY
CONCEPTUAL DRAINAGE STUDY

SOIL TAXONOMY MAP

SOURCE: http://soils.usda.gov/technical/classification/taxonomy/

WorleyParsons
resources & energy

Rice Solar Energy Facility
Conceptual Drainage Study

Soil Taxonomy List
Source: http://soils.usda.gov/technical/classification/taxonomy/

ID. NAME,CLASS

0. CAJON,"TYPIC TORRIPSAMMENTS, MIXED, THERMIC"

1. NICKEL,"TYPIC CALCIORTHIDS, LOAMY-SKELETAL, MIXED, THERMIC"

2. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

3,TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

4. BADLAND

5. GUNSIGHT,"TYPIC CALCIORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

6. ROSITAS,"TYPIC TORRIPSAMMENTS, MIXED, HYPERTHERMIC"

7. CALVISTA,"LITHIC CAMBORTHIDS, LOAMY, MIXED, THERMIC"

8. CALVISTA,"LITHIC CAMBORTHIDS, LOAMY, MIXED, THERMIC"

9. BADLAND

10. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

11. NICKEL,"TYPIC CALCIORTHIDS, LOAMY-SKELETAL, MIXED, THERMIC"

12. UPSPRING,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

13. HYDER, "LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), HYPERTHERMIC "

14. HYDER, "LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), HYPERTHERMIC "

15. LAPOSA,"TYPIC CAMBORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

16. HYDER, "LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), HYPERTHERMIC "

17. CAJON,"TYPIC TORRIPSAMMENTS, MIXED, THERMIC"

18. UPSPRING,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS),

THERMIC"

19. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

20. ROSITAS,"TYPIC TORRIPSAMMENTS, MIXED, HYPERTHERMIC"

21. ROSITAS,"TYPIC TORRIPSAMMENTS, MIXED, HYPERTHERMIC"

22. GUNSIGHT,"TYPIC CALCIORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

23. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

24. HYDER, "LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), HYPERTHERMIC "

25. HYDER, "LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), HYPERTHERMIC "

26. GUNSIGHT,"TYPIC CALCIORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

27. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

28. ROSITAS,"TYPIC TORRIPSAMMENTS, MIXED, HYPERTHERMIC"

29. HYDER, "LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), HYPERTHERMIC "

30. ROSITAS,"TYPIC TORRIPSAMMENTS, MIXED, HYPERTHERMIC"

31. PLAYAS

32. GUNSIGHT,"TYPIC CALCIORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

33. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

34. CIBOLA, "TYPIC TORRIFLUVENTS, FINE-SILTY OVER SANDY OR SANDY-SKELETAL, MIXED (CALCAREOUS), HYPERTHERMIC "

35. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

36. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

37. ROSITAS,"TYPIC TORRIPSAMMENTS, MIXED, HYPERTHERMIC"

38. LAPOSA,"TYPIC CAMBORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

39. GUNSIGHT,"TYPIC CALCIORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

40. SCHENCO, "TYPIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS),

HYPERTHERMIC, SHALLOW "

41. LITHIC TORRIORTHENTS, LITHIC TORRIORTHENT S

42. GUNSIGHT,"TYPIC CALCIORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

43. GUNSIGHT,"TYPIC CALCIORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

44. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

45. CIBOLA, "TYPIC TORRIFLUVENTS, FINE-SILTY OVER SANDY OR SANDY-SKELETAL, MIXED (CALCAREOUS), HYPERTHERMIC "

46. LAPOSA,"TYPIC CAMBORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

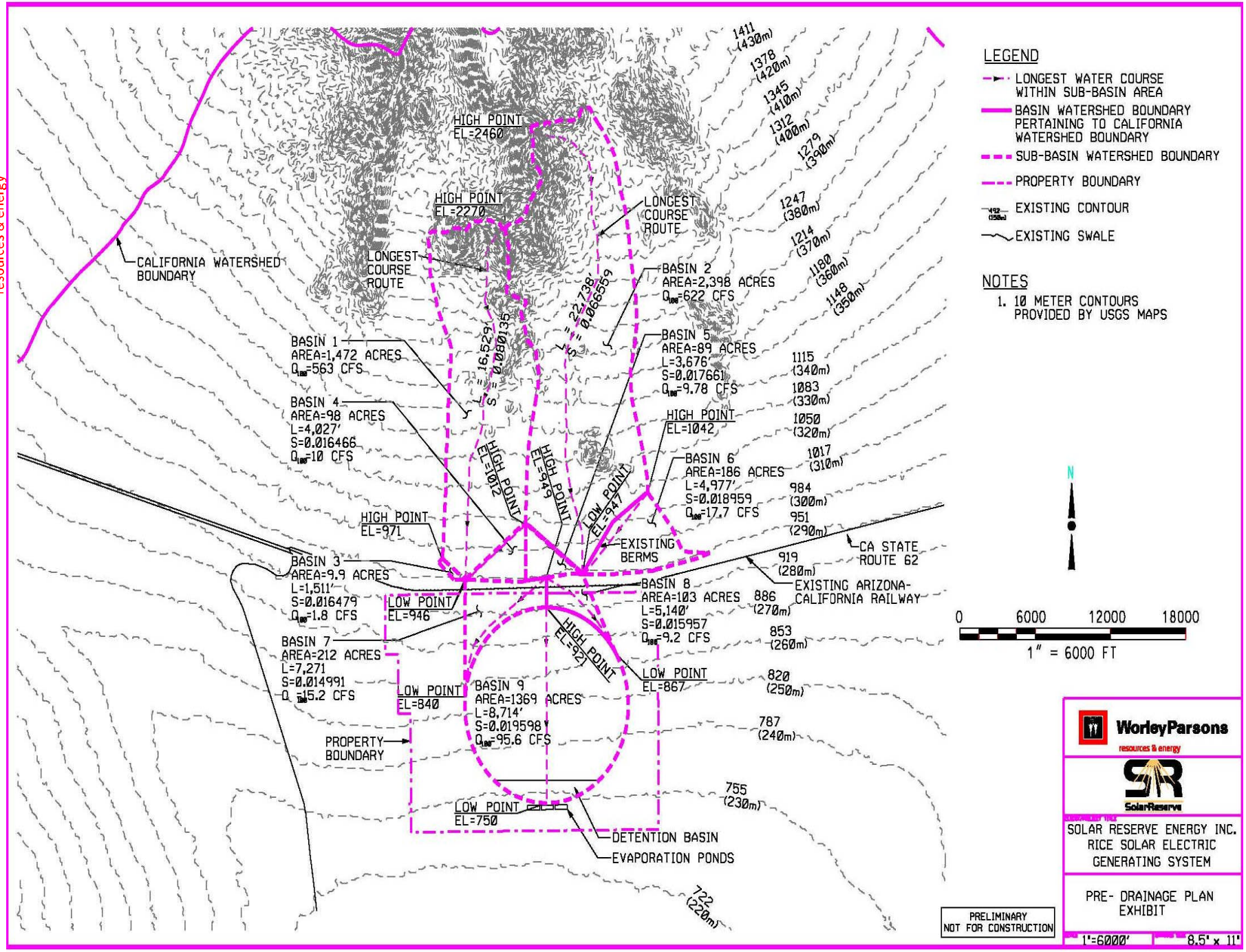
47. GUNSIGHT,"TYPIC CALCIORTHIDS, LOAMY-SKELETAL, MIXED, HYPERTHERMIC"

48. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

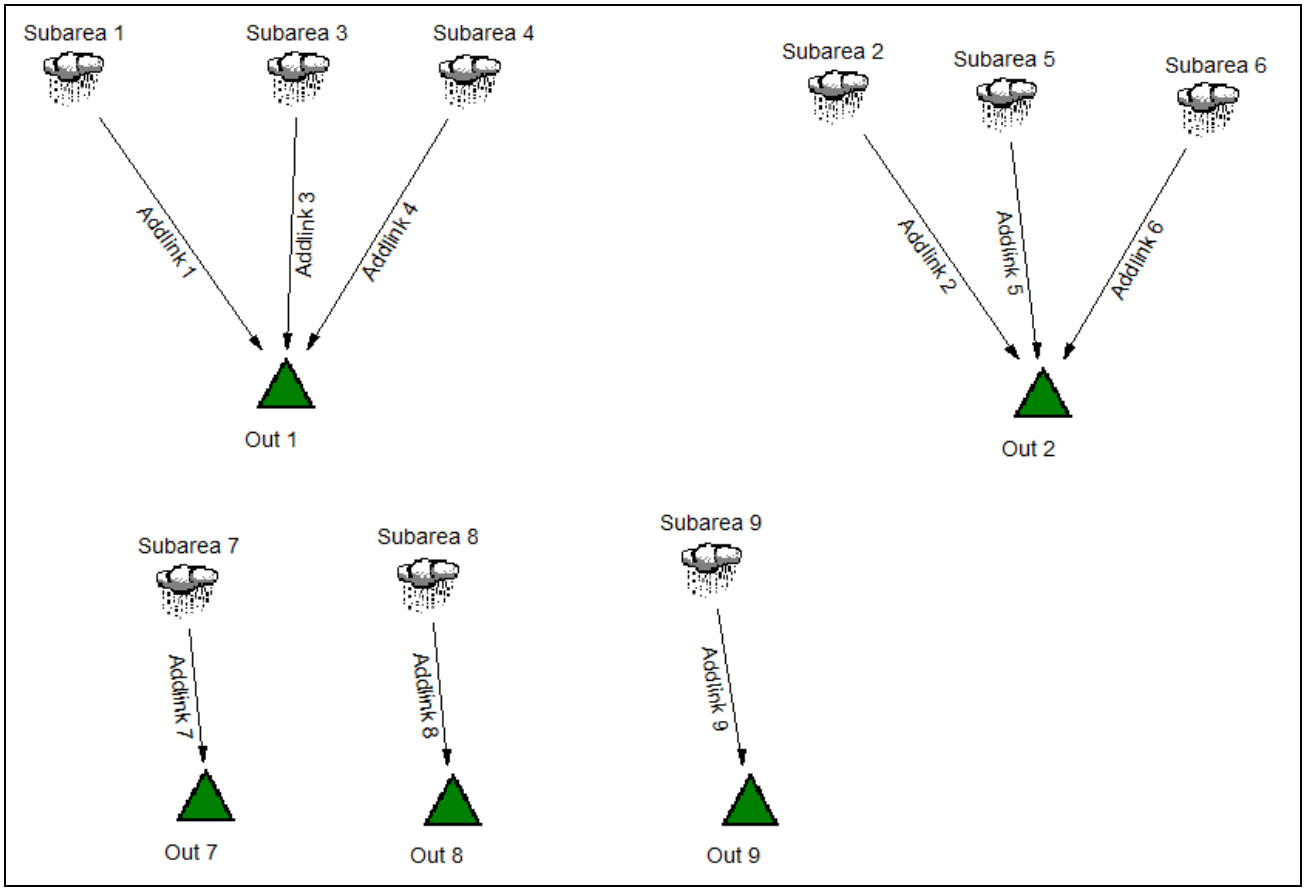
49. TECOPA,"LITHIC TORRIORTHENTS, LOAMY-SKELETAL, MIXED (CALCAREOUS), THERMIC"

50. CIBOLA, "TYPIC TORRIFLUVENTS, FINE-SILTY OVER SANDY OR SANDY-SKELETAL, MIXED (CALCAREOUS), HYPERTHERMIC "

APPENDIX D – PRE-DEVELOPED CONDITIONS


LEGEND
LONGEST WATER COURSE WITHIN SUB-BASIN AREA
BASIN WATERSHED BOUNDARY PERTAINING TO CALIFORNIA WATERSHED BOUNDARY
SUB-BASIN WATERSHED BOUNDARY
PROPERTY BOUNDARY
EXISTING CONTOUR
EXISTING SWALE
NOTES
1. 10 METER CONTOURS PROVIDED BY USGS MAPS
CALIFORNIA WATERSHED BOUNDARY
HIGH POINT EL=2460
HIGH POINT EL=2270
LONGEST COURSE ROUTE
LONGEST COURSE ROUTE
BASIN 1 AREA=1,472 ACRES Q100=563 CFS
BASIN 2 AREA=2,398 ACRES Q100=622 CFS
BASIN 4 AREA=98 ACRES L=4,027' S=0.016466 Q100=10 CFS
BASIN 5 AREA=89 ACRES L=3,676' S=0.017661 Q100=9.78 CFS
HIGH POINT EL=1042
BASIN 6 AREA=186 ACRES L=4,977' S=0.018959 Q100=17.7 CFS
HIGH POINT EL=1012
HIGH POINT EL=949
LOW POINT EL=947
HIGH POINT EL=971
EXISTING BERMS
CA STATE ROUTE 62
BASIN 3 AREA=9.9 ACRES L=1,511' S=0.016479 Q100=1.8 CFS
LOW POINT EL=946
BASIN 8 AREA=103 ACRES L=5,140' S=0.015957 Q100=9.2 CFS
EXISTING ARIZONA-CALIFORNIA RAILWAY
BASIN 7 AREA=212 ACRES L=7,271 S=0.014991 Q100=15.2 CFS
HIGH POINT EL=921
LOW POINT EL=867
LOW POINT EL=840
BASIN 9 AREA=1369 ACRES L=8,714' S=0.019598 Q100=95.6 CFS
PROPERTY BOUNDARY
LOW POINT EL=750
DETENTION BASIN
EVAPORATION PONDS
1411 (430m)
1378 (420m)
1345 (410m)
1312 (400m)
1279 (390m)
1247 (380m)
1214 (370m)
1180 (360m)
1148 (350m)
1115 (340m)
1083 (330m)
1050 (320m)
1017 (310m)
984 (300m)
951 (290m)
919 (280m)
886 (270m)
853 (260m)
820 (250m)
787 (240m)
755 (230m)
722 (220m)
N
0 6000 12000 18000
1" = 6000 FT
PRELIMINARY NOT FOR CONSTRUCTION
WorleyParsons resources & energy
SolarReserve
SOLAR RESERVE ENERGY INC.
RICE SOLAR ELECTRIC GENERATING SYSTEM
PRE- DRAINAGE PLAN EXHIBIT
1"=6000'
8.5" x 11"

BENTLEY PONDPACK MODEL IMAGE – PRE DEVELOPED CONDITIONS FOR RICE SOLAR ENERGY PROJECT



EXCEPTS FROM THE BENTLEY PONDPACK MODEL – PRE DEVELOPED CONDITIONS FOR RICE SOLAR ENERGY PROJECT

Job File: T:\01-Projects\Solar Reserve\Project Rice\Engineering\Civil\H&H\PondPack\PROJECTRICEPRE.PPW
Rain Dir: T:\01-Projects\Solar Reserve\Project Rice\Engineering\Civil\H&H\PondPack\

==========
JOB TITLE
==========

Project Date: 2/24/2009
Project Engineer: Bob.Anders
Project Title: Watershed Results
Project Comments:
Model of Project Rice in Riverside County, CA

S/N:
PondPack Ver: Compute Time: Date:

MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyStorms

Return Event	Total Depth in	Rainfall Type	RNF ID
Pre100	3.3200	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY

SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Return Type	HYG Event	Vol ac-ft	Trun	Qpeak hrs	Max Qpeak cfs	Max WSEL ft	Pond Storage ac-ft
*OUT 1	JCT	100	106.603		12.6000	572.05		
*OUT 2	JCT	100	166.203		12.9500	637.90		
*OUT 7	JCT	100	5.071		12.8000	15.15		
*OUT 8	JCT	100	2.468		12.5000	9.16		
*OUT 9	JCT	100	32.779		12.8500	95.57		
SUBAREA 1	AREA	100	104.017		12.6000	563.40		
SUBAREA 2	AREA	100	159.622		12.9500	621.96		

SUBAREA 3	AREA	100	.237	12.1000	1.83
SUBAREA 4	AREA	100	2.349	12.4000	10.00
SUBAREA 5	AREA	100	2.133	12.3000	9.78
SUBAREA 6	AREA	100	4.449	12.4500	17.70
SUBAREA 7	AREA	100	5.071	12.8000	15.15
SUBAREA 8	AREA	100	2.468	12.5000	9.16
SUBAREA 9	AREA	100	32.779	12.8500	95.57

File.... T:\01-Projects\Solar Reserve\Project Rice\Engineering\Civil\H&H\PondPack\PROJECTRICEPRE.PPW

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Desert shrub - fair	55	580.860			55.00
Desert shrub - fair	72	541.730			72.00
Desert shrub - fair	86	349.300			86.00
COMPOSITE AREA & WEIGHTED CN --->		1471.890			68.61 (69)

::

Type.... Runoff CN-Area
Name.... SUBAREA 2

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Desert shrub - fair	55	795.340			55.00
Desert shrub - fair	72	1279.390			72.00
Desert shrub - fair	86	323.160			86.00
COMPOSITE AREA & WEIGHTED CN --->		2397.890			68.25 (68)

Type.... Runoff CN-Area
Name.... SUBAREA 3

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Desert shrub - fair	55	9.900			55.00
COMPOSITE AREA & WEIGHTED CN --->		9.900			55.00 (55)

::

Type.... Runoff CN-Area
Name.... SUBAREA 4

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Desert shrub - fair	55	98.090			55.00

COMPOSITE AREA & WEIGHTED CN ---> 98.090 55.00 (55)
::

Type.... Runoff CN-Area
Name.... SUBAREA 5

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Desert shrub - fair	55	89.070			55.00

COMPOSITE AREA & WEIGHTED CN ---> 89.070 55.00 (55)
::

Type.... Runoff CN-Area
Name.... SUBAREA 6

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Desert shrub - fair	55	185.810			55.00

COMPOSITE AREA & WEIGHTED CN ---> 185.810 55.00 (55)
::

Type.... Runoff CN-Area
Name.... SUBAREA 7

Soil/Surface Description	Area CN	acres	Impervious Adjustment %C	%UC	Adjusted CN
Desert shrub - fair	55	211.790			55.00

COMPOSITE AREA & WEIGHTED CN ---> 211.790 55.00 (55)
::

Type.... Runoff CN-Area
Name.... SUBAREA 8

Soil/Surface Description	Area CN	acres	Impervious Adjustment %C	%UC	Adjusted CN
Desert shrub - fair	55	103.070			55.00

COMPOSITE AREA & WEIGHTED CN ---> 103.070 55.00 (55)
::

Type.... Runoff CN-Area
Name.... SUBAREA 9

Soil/Surface Description	Area CN	acres	Impervious Adjustment %C	%UC	Adjusted CN
Desert shrub - fair	55	1369.050			55.00

COMPOSITE AREA & WEIGHTED CN ---> 1369.050 55.00 (55)
::

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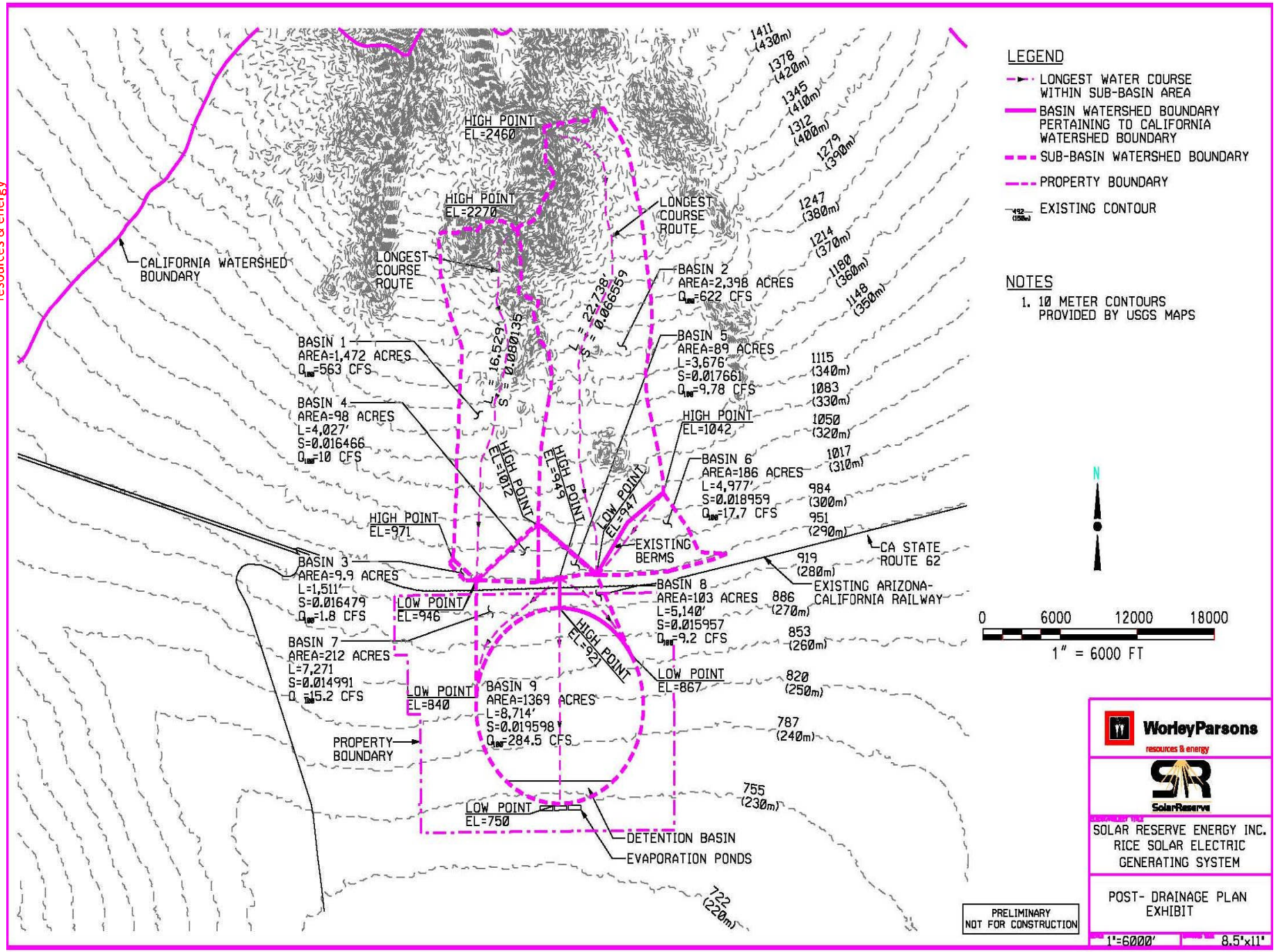
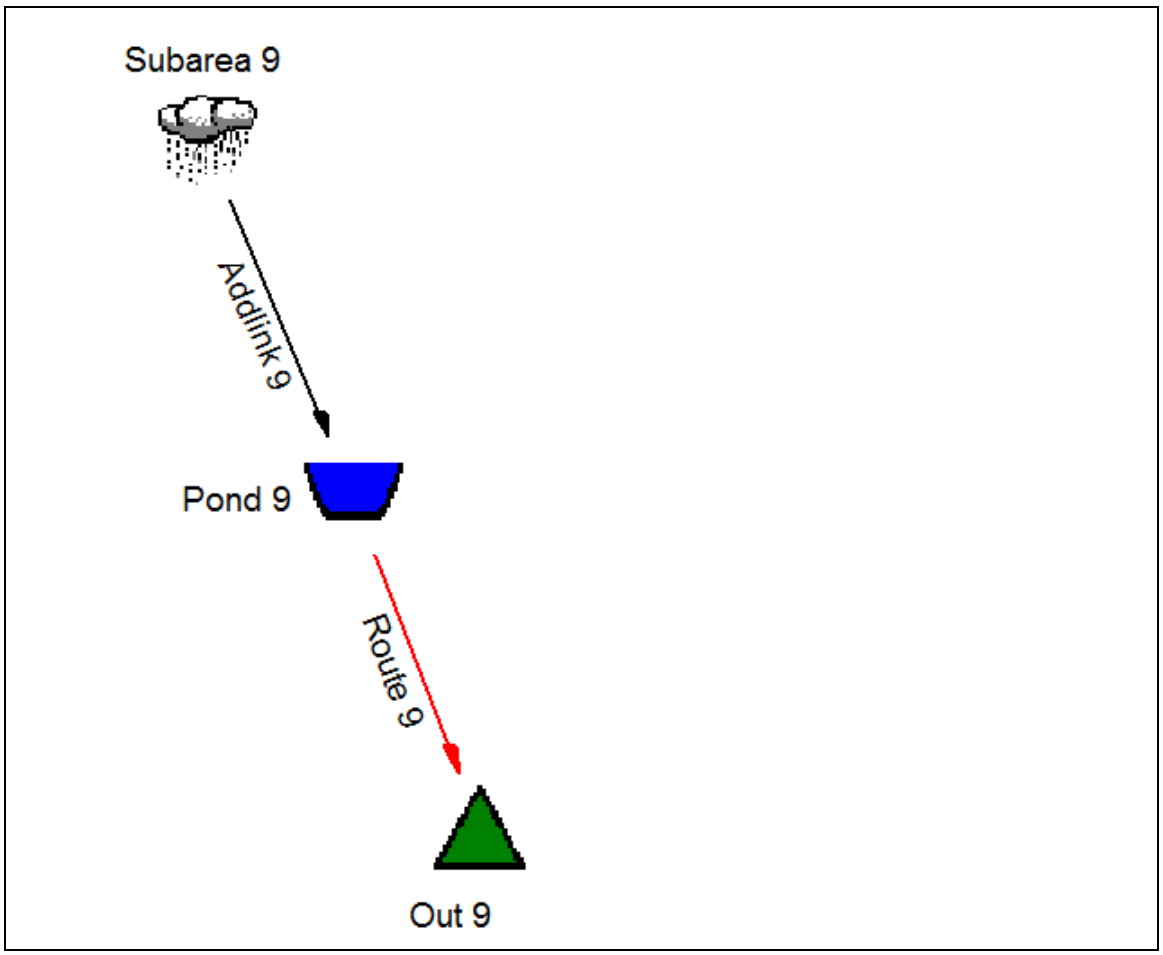
APPENDIX E – POST-DEVELOPED CONDITIONS


HIGH POINT
EL=2460
HIGH POINT
EL=2270
LONGEST
COURSE
ROUTE
CALIFORNIA WATERSHED
BOUNDARY
LONGEST
COURSE
ROUTE
BASIN 1
AREA=1,472 ACRES
Q100=563 CFS
BASIN 4
AREA=98 ACRES
L=4,027'
S=0.016466
Q100=10 CFS
L = 16,529'
S = 0.080135
L = 22,738'
S = 0.066559
BASIN 2
AREA=2,398 ACRES
Q100=622 CFS
BASIN 5
AREA=89 ACRES
L=3,676'
S=0.017661
Q100=9.78 CFS
HIGH POINT
EL=1042
BASIN 6
AREA=186 ACRES
L=4,977'
S=0.018959
Q100=17.7 CFS
HIGH POINT
EL=1012
HIGH POINT
EL=949
LOW POINT
EL=947
HIGH POINT
EL=971
EXISTING
BERMS
CA STATE
ROUTE 62
EXISTING ARIZONA-
CALIFORNIA RAILWAY
BASIN 3
AREA=9.9 ACRES
L=1,511'
S=0.016479
Q100=1.8 CFS
LOW POINT
EL=946
BASIN 8
AREA=103 ACRES
L=5,140'
S=0.015957
Q100=9.2 CFS
HIGH POINT
EL=921
LOW POINT
EL=867
BASIN 7
AREA=212 ACRES
L=7,271
S=0.014991
Q100=15.2 CFS
LOW POINT
EL=840
BASIN 9
AREA=1369 ACRES
L=8,714'
S=0.019598
Q100=284.5 CFS
PROPERTY
BOUNDARY
LOW POINT
EL=750
DETENTION BASIN
EVAPORATION PONDS
1411 (430m)
1378 (420m)
1345 (410m)
1312 (400m)
1279 (390m)
1247 (380m)
1214 (370m)
1180 (360m)
1148 (350m)
1115 (340m)
1083 (330m)
1050 (320m)
1017 (310m)
984 (300m)
951 (290m)
919 (280m)
886 (270m)
853 (260m)
820 (250m)
787 (240m)
755 (230m)
722 (220m)
LEGEND
LONGEST WATER COURSE WITHIN SUB-BASIN AREA
BASIN WATERSHED BOUNDARY PERTAINING TO CALIFORNIA WATERSHED BOUNDARY
SUB-BASIN WATERSHED BOUNDARY
PROPERTY BOUNDARY
EXISTING CONTOUR
NOTES
1. 10 METER CONTOURS PROVIDED BY USGS MAPS
N
0 6000 12000 18000
1" = 6000 FT
PRELIMINARY
NOT FOR CONSTRUCTION
WorleyParsons
resources & energy
SolarReserve
SOLAR RESERVE ENERGY INC.
RICE SOLAR ELECTRIC
GENERATING SYSTEM
POST- DRAINAGE PLAN
EXHIBIT
1"=6000'
8.5"x11"

BENTLEY PONDPACK MODEL IMAGE – POST DEVELOPED CONDITIONS FOR RICE SOLAR ENERGY PROJECT



EXCEPTS FROM THE BENTLEY PONDPACK MODEL – POST DEVELOPED CONDITIONS FOR RICE SOLAR ENERGY PROJECT

Job File: T:\01-Projects\Solar Reserve\Project Rice\Engineering\Civil\H&H\PondPack\PROJECTRICEPOST_9.PPW
Rain Dir: T:\01-Projects\Solar Reserve\Project Rice\Engineering\Civil\H&H\PondPack\

==========
JOB TITLE
==========

Project Date: 2/23/2009
Project Engineer: Bob.Anders
Project Title: Pre Watershed Results
Project Comments:
Model of Project Rice in Riverside County, CA

S/N:
PondPack Ver: Compute Time: Date:

MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyStorms

Return Event	Total Depth in	Rainfall Type	RNF ID
Dev100	3.3200	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Return Type	Event	HYG Vol ac-ft	Trun	Qpeak hrs	Max Qpeak cfs	Max WSEL ft	Pond Storage ac-ft
*OUT 9	JCT	100	65.494		12.7500	284.52		
POND 9	IN POND	100	65.494		12.7500	284.52		
POND 9	OUT POND	100	65.494		12.7500	284.52		
SUBAREA 9	AREA	100	65.494		12.7500	284.52		

Type.... Runoff CN-Area
Name.... SUBAREA 9

File.... T:\01-Projects\Solar Reserve\Project Rice\Engineering\Civil\H&H\PondPack\PROJECTRICEPOST_9.PPW

RUNOFF CURVE NUMBER DATA

::

Soil/Surface Description	Area CN	Adjustment acres	Impervious %C	Impervious %UC	Adjusted CN
Desert shrub - poor	63	1369.050			63.00

COMPOSITE AREA & WEIGHTED CN ---> 1369.050 63.00 (63)

::

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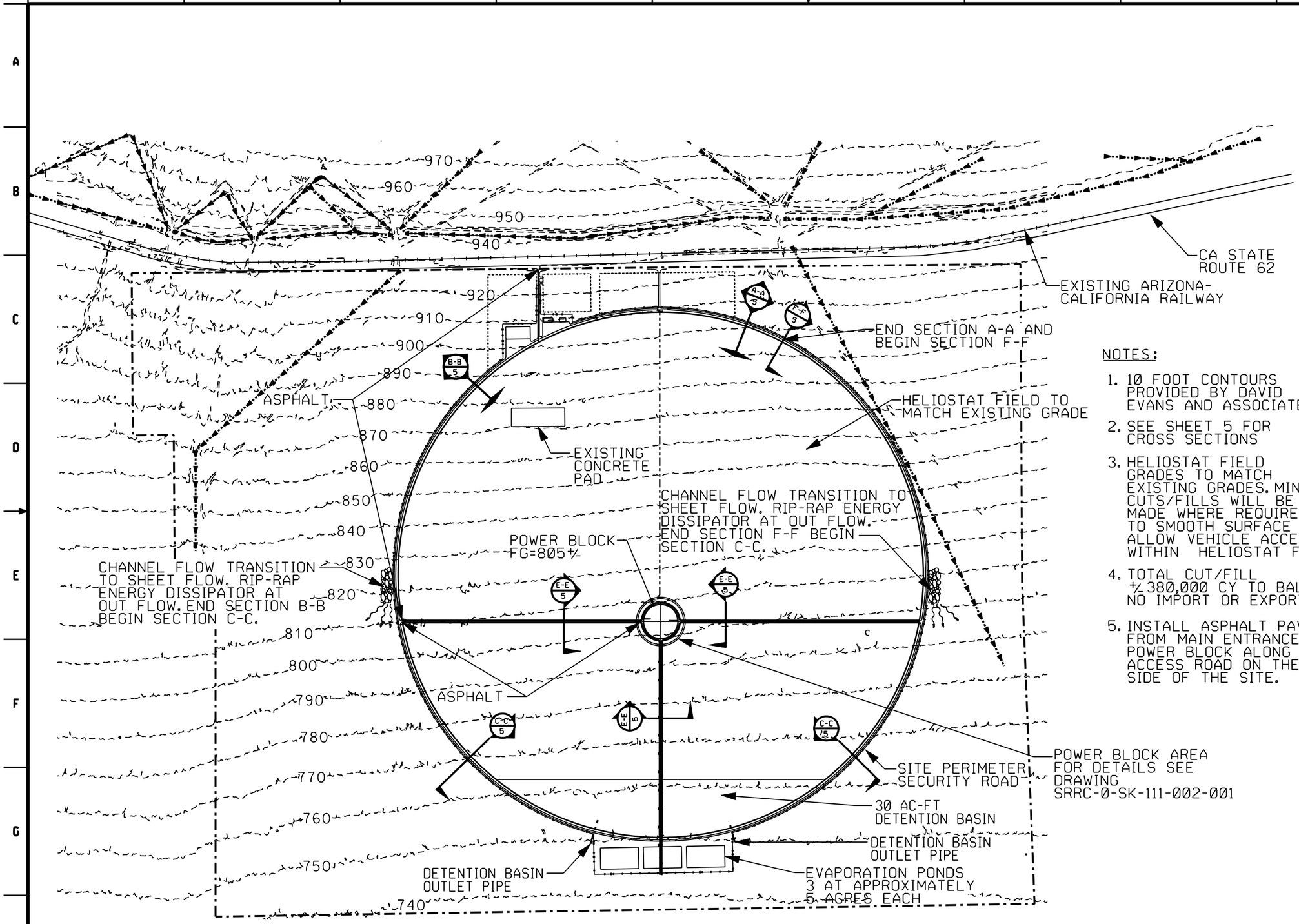
APPENDIX F – CONCEPTUAL GRADING PLANS



LEGEND:

- PROPERTY BOUNDARY
- 492 EXISTING CONTOUR
- EXISTING BERM

N

0 1600 3200

1" = 1600 FT

NOTES:

1. 10 FOOT CONTOURS PROVIDED BY DAVID EVANS AND ASSOCIATES
2. SEE SHEET 5 FOR CROSS SECTIONS
3. HELIOSTAT FIELD GRADES TO MATCH EXISTING GRADES. MINOR CUTS/FILLS WILL BE MADE WHERE REQUIRED TO SMOOTH SURFACE TO ALLOW VEHICLE ACCESS WITHIN HELIOSTAT FIELD.
4. TOTAL CUT/FILL ±380,000 CY TO BALANCE. NO IMPORT OR EXPORT.
5. INSTALL ASPHALT PAVEMENT FROM MAIN ENTRANCE TO POWER BLOCK ALONG THE ACCESS ROAD ON THE WEST SIDE OF THE SITE.

REV	DATE	DESCRIPTION	ORIG	DRAWN	CHKD	APPD
C	08/24/09	UPDATE EVAPORATION POND				
B	08/24/09	ISSUED FOR PERMITTING	CM	JD	CM	JD
A	08/20/09	ISSUED FOR PERMITTING	CM	JD	CM	JD

CHK'R (Engineer) STATUS — DATE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.

APPROVED STATUS — DATE — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.

ORIGINATING PERSONNEL	PROFESSIONAL ENGINEER'S SEAL
DRAWN BY: C. MAHER	
CHECKED BY: J. DAHLGREN	
LEAD DESIGNER: C. MAHER	
ENGINEER/TECH SPECIALIST: J. DAHLGREN	
PROJECT ENGINEERING MANAGER: B. ANDERS	
PROJECT MANAGER: B. ANDERS	

Zero Harm — Leadership No Incidents Safe Behavior

WorleyParsons resources & energy

SolarReserve

CLIENT/PROJECT TITLE

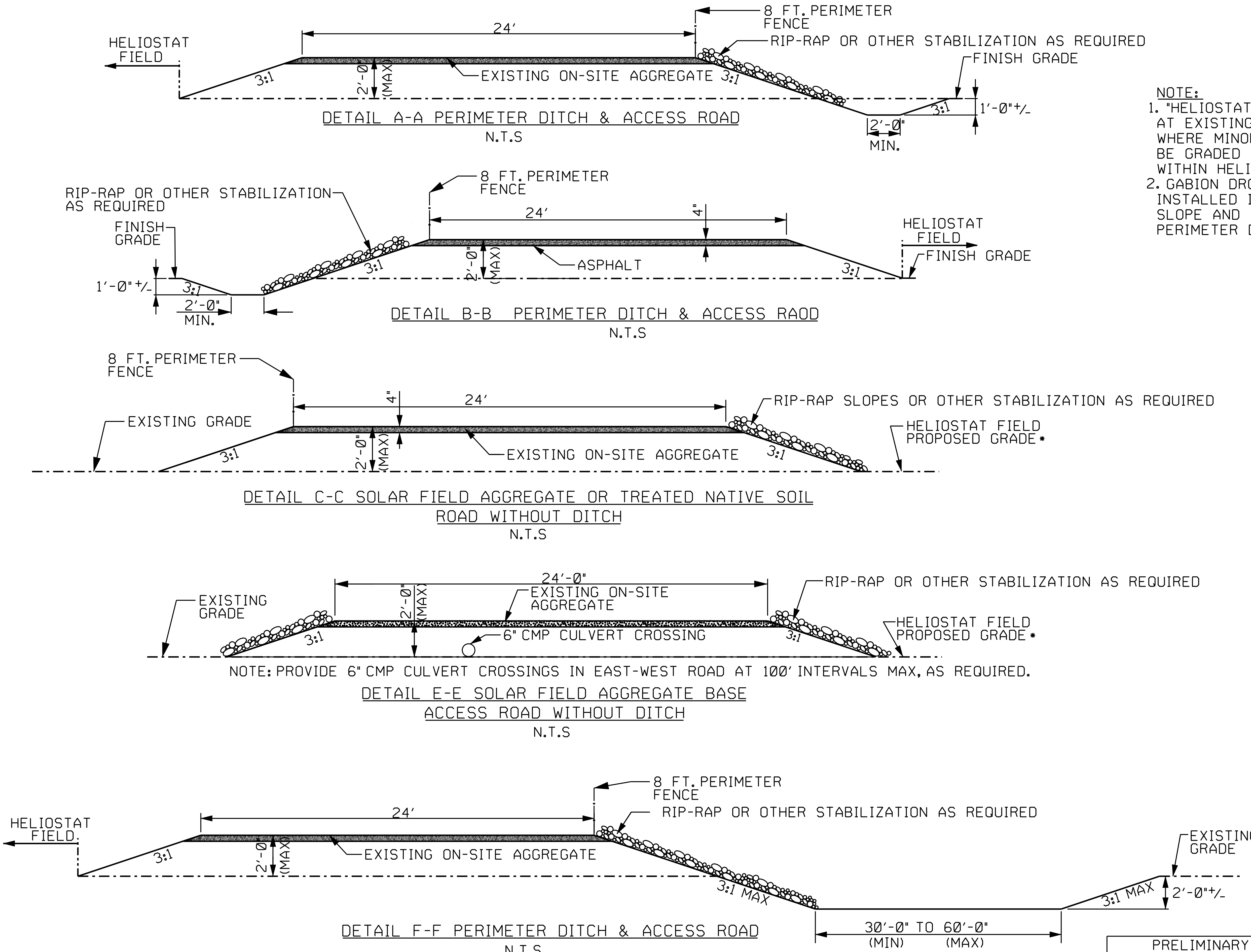
RICE SOLAR ENERGY PROJECT

CONCEPTUAL GRADING AND DRAINAGE PLAN

SCALE 1"=1600' | DRAWING SIZE 11"x17"

WORLEYPARSONS DWG NO. SRRC-0-SK-112-735-004 | REV C

PRELIMINARY NOT FOR CONSTRUCTION



NOTE:

1. "HELIOSTAT FIELD PROPOSED GRADE" IS AT EXISTING SURFACE GRADE, EXCEPT WHERE MINOR RUTS / DEPRESSIONS MUST BE GRADED TO ALLOW VEHICLE ACCESS WITHIN HELIOSTAT FIELD.
2. GABION DROP STRUCTURES MAY BE INSTALLED IN DITCHES TO LIMIT DITCH SLOPE AND VELOCITY WITHIN THE PERIMETER DITCHES.

PRELIMINARY
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/TECH SPEC	LEAD DISC ENGINEER	PROJ ENGR MANAGER	PROJECT MANAGER
C	08 24 09	ISSUED FOR REVISION	CM	JD	CM	JD	BA	BA	BA
B	08 05 09	ISSUED FOR PERMITTING	CM	JD	CM	JD	BA	BA	BA
A	02 11 09	ISSUED FOR PERMITTING	CM	JD	CM	JD	BA	BA	BA

PRELIMINARY STATUS — DATE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
LDE

APPROVED STATUS — DATE — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
LDE

ORIGINATING PERSONNEL

DRAWN BY: C. MAHER
CHECKED BY: J. DAHLGREN
LEAD DESIGNER: C. MAHER
ENGINEER/TECH SPECIALIST: J. DAHLGREN
PROJECT ENGINEERING MANAGER: B. ANDERS
PROJECT MANAGER: B. ANDERS

PROFESSIONAL ENGINEER'S SEAL

Zero Harm — Leadership, No Incidents, Safe Behavior

PE: STATE: LIC. NO.: DATE:

WorleyParsons
resources & energy

SolarReserve

CLIENT/PROJECT TITLE: RICE SOLAR ENERGY PROJECT

CONCEPTUAL GRADING AND DRAINAGE PLAN CROSS SECTIONS

SCALE: 1"=1000' | DRAWING SIZE: 11"x17"

WORLEYPARSONS DWG. NO.: SRRC-0-SK-112-735-005 | REV: C

SRRC-0-SK-112-735-005.dgn 8/31/2009 12:51:39 PM

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE *RICE SOLAR ENERGY POWER PLANT PROJECT*

Docket No. 09-AFC-10

PROOF OF SERVICE
(Revised 3/4/2010)

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*indicates change

DECLARATION OF SERVICE

I, Haneefah Walker, declare that on April 27, 2010 , I served and filed copies of the attached, 09-AFC-10-RSEP Supplemental Filing Response to CEC DR 49-51, 54, 56, 58, 75, and 121. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [http://www.energy.ca.gov/sitingcases/ricesolar].

The documents have been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

____ sent electronically to all email addresses on the Proof of Service list;

__x__ by personal delivery

_____ by delivering on this date for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for the mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

_____ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-10
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Haneefah Walker